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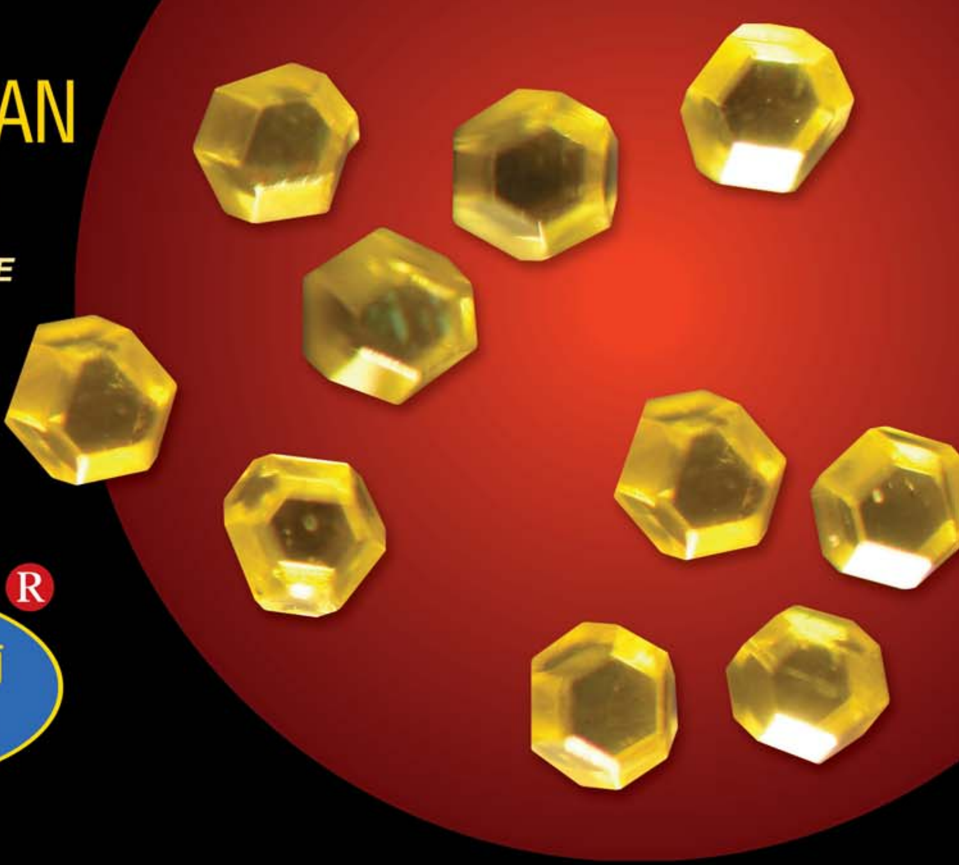

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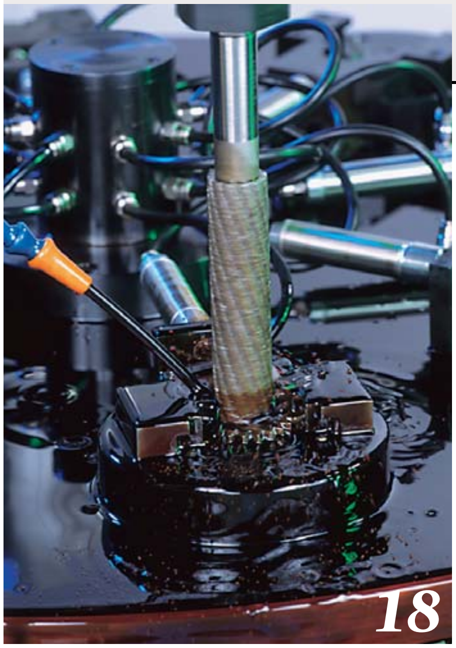

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### COVER PHOTO

Photograph of the QXD200 Machine Tool's small pallet system which utilizes radio-frequency identification (RFID) coding to match the tool with the machining program. This RFID is read at the machine door and all appropriate changes (program, electrode, grinding wheel) are loaded in to the machine for processing. Photograph is courtesy of Vollmer of America Corporation.

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**FINER POINTS** is the only publication devoted exclusively to the understanding, selection and application of diamond, cubic boron nitride and related materials. It is edited for recipients who are involved in some way with these "superabrasives", either as providers of the materials, producers of products containing the materials or users of these products (e.g., grinding wheels, dressing tools, drill bits, saw blades, sawing wires, cutting tools, polishing compounds, CVD film products, etc.).

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# A Finer Point of View…

## Service and Value

**PRESIDENT**
David L. Edwards

Today we live in a true global village and all manufacturers are feeling the pressure of competing on a playing field that may seem somewhat skewed in favor of overseas competitors that sell at a lower price. How does a company combat seemingly lower-price attacks on their market share? I submit its service and "real" value and these are tied to the education of customers and potential customers. Media reach has expanded exponentially as email messages and Internet websites spring up all over the world with the promise of lower price and better quality. Those of us who spend any portion of our day at the computer can attest to the influx of "junk" mail that promise everything from hair growth and get rich quick schemes to unheard of discounts and miracle cures. Unfortunately those of us "in the know" pass these off as scams and nonsense, but there are always those who will believe anything and the hook sets deep on these unwary targets. Many of our customers fit into this group and the promise of a cheaper grinding wheel, lower priced sawblade and cut-rate abrasives is too much to resist. So what is an honest supplier to do? Educate and pass the word any way possible, that's the answer. Educate customers and potential customers on the folly of buying from the unproven or "discount" supplier. Name brand is always the bench mark for where we should be. Name brand is a proven entity developed year after year by proven quality and long-term performance. A local tire dealership has a very good ad campaign going on right now and he literally points out the pitfalls of buying a discount tire on-line. He points out the safety and performance issues of buying this way and targets the costly measures a consumer will face if anything goes wrong … It is a very effective ad and I can see how our industry can present the same arguments. We hear time and time again of someone buying diamond or cBN products on-line and maybe even the first or second time they are used they work well and then reality sets in and the phantom Internet supply house begins sending low grade or substitute materials and the manufacturing process goes downhill in a hurry. Now, you have a problem. Maybe you can reach someone, maybe not, but I guarantee the voice at the other end of the line is not going to show up at your door and help you solve performance issues or eliminate the manufacturing delays. That, my friend, only comes from brand name materials, well-established companies and above all … long-term relationships. A sale has to be more than just a purchasing transaction … a sale that is a true value isn't just based on price. A real "value" is deeply rooted in product quality, company reputation, personal service, application development and of course that handshake at the end of the day … I don't buy the important things in life just based on price … medical care is non-negotiable, fine dining is never discounted, my cars are purchased for quality and service in mind and my family's safety cannot be cut-rate. These are all things close to my heart. Why would I put any less value and care into purchasing materials that are critical to my livelihood and the success of my business? Service and value will always be high on my list!

Sincerely,

David Edwards

David L. Edwards, President
Industrial Diamond Association of America

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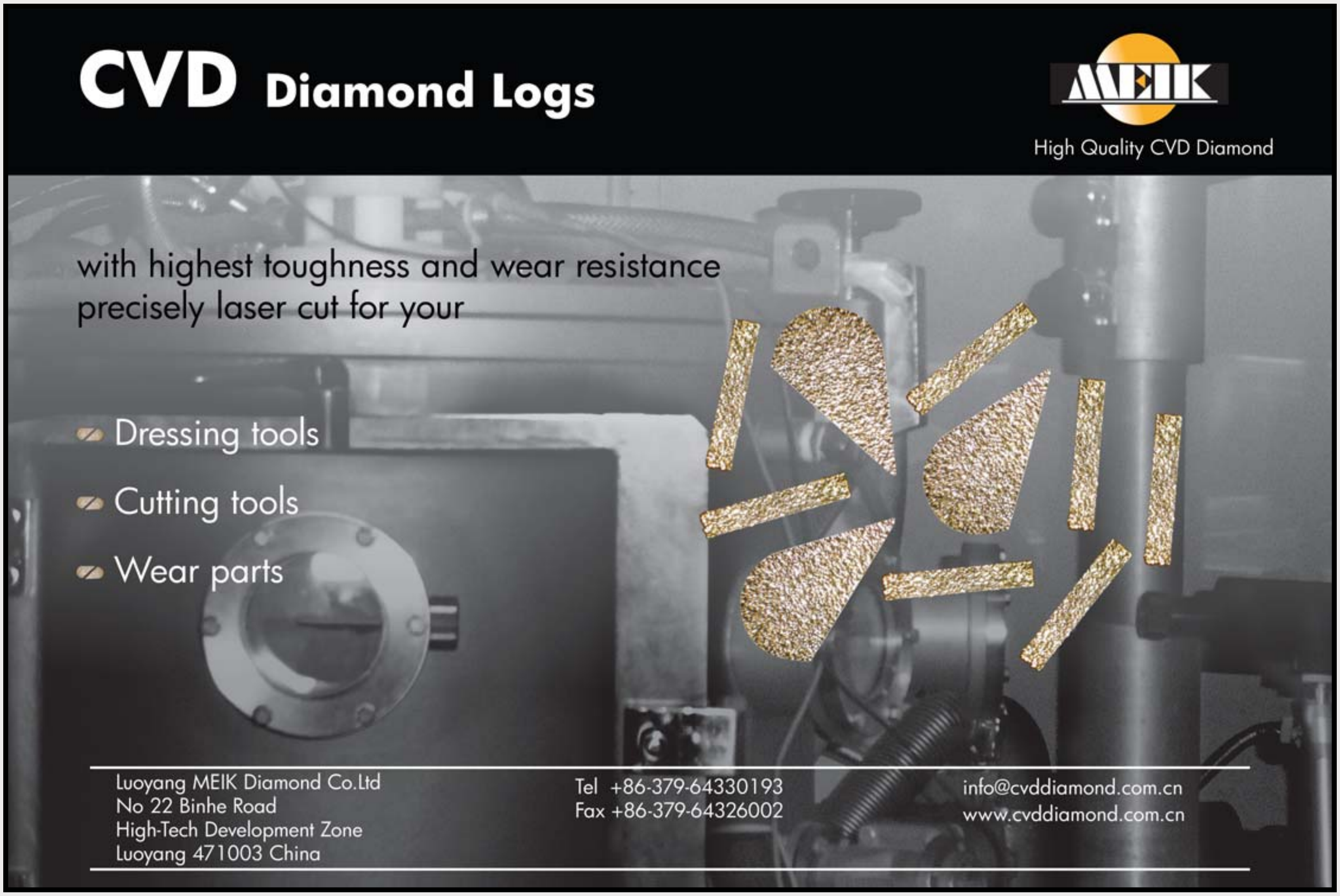
# I Never Knew Quite What It Was and I Guess I Never Will

**TERRY KANE, Editor**

In the 1960's the Folk Singers *Peter, Paul and Mary* did a song called *The Marvelous Toy*. In this song the toy was described as a quite fantastic object that went: "Zip when it moved, pop when it stopped and Whirr when it stood still". As the 2010 IMTS approaches I am reminded of many of the "Marvelous Toys" that I have seen since my first IMTS back in the early 1970's. At that time I was a young technician standing in an exhibit booth demonstrating a new abrasive. I was operating a simple K.O. Lee off-hand grinder, sharpening an end mill by smoothly infeeding the end mill and drawing it slowly back across the face of a grinding wheel that contained a revolutionary new crystal called cubic boron nitride (cBN) … You know, I can still remember the feel of that fixture and the smoothness that only comes from an air bearing. The entire sharpening process was accomplished dry and it amazed the old-time tool makers that stopped by the booth. There was no burn on the tool and the dust and flying grit that usually accompanied conventional aluminum oxide wheel grinding was non-existent … This was truly a wonderful product. Little did we all know what a tremendous effect this small crystal would have on all the machine tools throughout the IMTS that day and for years to come! Machine tools of the future would be custom designed to take full advantage of cBN. Remember, in the 1970's it was still the "Machine Tool Show" and the "machine" was king … I remember walking the halls back then and seeing all the marvelous toys! Many were still hand operated and I was fascinated by the artistic work of the operators and how they deftly meshed infeed, downfeed and crossfeed through a series of expert movements of handwheels. Most machines had already converted with "automation" of some type as preprogrammed punched tapes directed machine movements and operation. We had been introduced to terms like CNC and computer numerically controlled was the theme of new technology! The first NC machines were built in the 1940s and '50s, based on existing machines that were modified with motors that moved the hand controls to follow points fed into the system on paper tape … Remember those!! The more magnificent the toy the more lights and bells and whistles a machine had and the more impressive the process. In the early 70's I was still a novice when it came to determining exactly what some of the new machines were supposed to accomplish, I looked at each one with a renewed wonder and amazement … much like the little boy in that song who found wonderment in each movement and motion … Over the years I must admit I was still amazed at machine development as computers, auto feed systems, high speed spindles, automated part load and unload, multiple head changers and high pressure coolant delivery systems combined to make machine tools operate around the clock and with minimal operator attendance. Cubic boron nitride had a lot to do with these machine capabilities. In 2010 I once again look forward to seeing what new wonderment my eyes will behold … I'd be willing to bet, they still go *zip when they move, pop when they stop and whirr when they stand still* … Ah yes, the most marvelous toys are still at IMTS!



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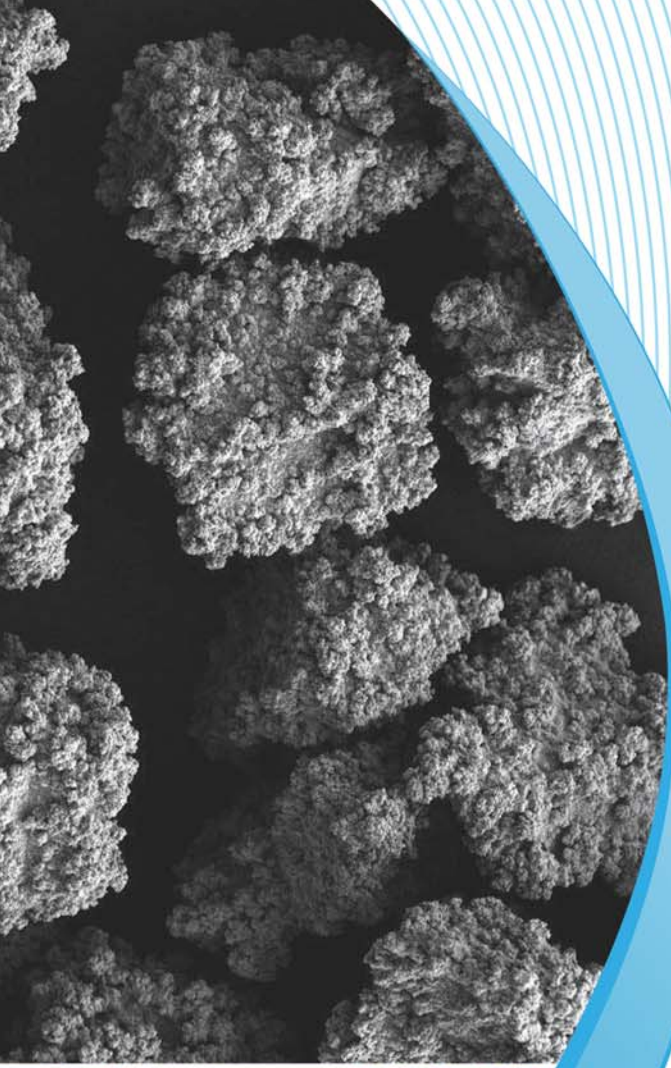

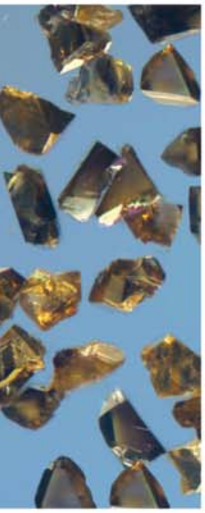

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# OPTIMIZED PCD TOOL PROCESSING

**SCOTT RIES, PCD Division Manager**
**Vollmer of America Corporation**

## NEW EQUIPMENT DEVELOPMENTS KEEP TOOL PRODUCERS COMPETITIVE

***The recent economic conditions have created an unprecedented need for reevaluation of all costs associated with the manufacturing process. For many machining applications, the conversion to polycrystalline diamond (PCD) tools and upgraded automation has allowed end users to remain competitive in this global market place. PCD tool producers have also had to reevaluate their cost structures. New technology, automated operations, and offline programming have enabled many of the tool producers to compete against the lower labor costs in many areas outside of the United States. New equipment from the machine tool builders have addressed many of these concerns and succeeded in reducing tool production costs.***

**Above photo is the vertical placement of tool to be processed.**

## PCD Tool Grades Expanded for Use On More Materials

The development of various grades of polycrystalline diamond (PCD) in the early 1970s enabled engineers to accurately machine many new materials across various industries. While the early PCD tools were used primarily in turning and grooving applications of non ferrous materials, today we see PCD used on everything from plastics and composites, to laminate flooring and engine blocks. PCD has been used in milling cutters, drills, saws and any kind of geometry used in creating chips or machining of materials. The development of these various applications and tool designs was advanced by the introduction of laminate flooring in the mid 1980s. This industry needed diamond segments that were larger than the original 8.1mm and 12.7mm discs. As the PCD manufacturers created larger disks of PCD, the per-tip cost also began decreasing, and experiments took place to optimize this material in new applications.

## Finishing PCD Tools for Various Applications

As the end user began realizing the benefits of the PCD materials, the tool producer was faced with additional challenges. How could the "hardest material known to man" be machined accurately and with good surface finish into the various geometries needed in these applications?

The first methods of segmenting the PCD disk involved lasers and 2 axis DC powered wire EDMs (electrical discharge machines). The edge quality produced with these machines was very rough and often .2mm would need to be ground off in order to have a useful tool surface. Each tool manufacturer developed their own "secret" methods for completing tools. It wasn't until the mid to late 1980s that machine tool builders began to see the need to create machines to address the challenges created by PCD.

Erosion technology, lasers and water jets have improved immensely in the last thirty years and are now very common in shops that produce PCD tools. However, challenges in producing PCD tools still exist. The typical processing for diamond tools consists of brazing a PCD segment to an existing steel or carbide tool body. The PCD edges are then eroded to size for use in woodworking applications and prior to further processing for other types of uses. In metalworking applications a ground edge has been preferred in the past due to the small amount of thermal damage that exists from the erosion process.

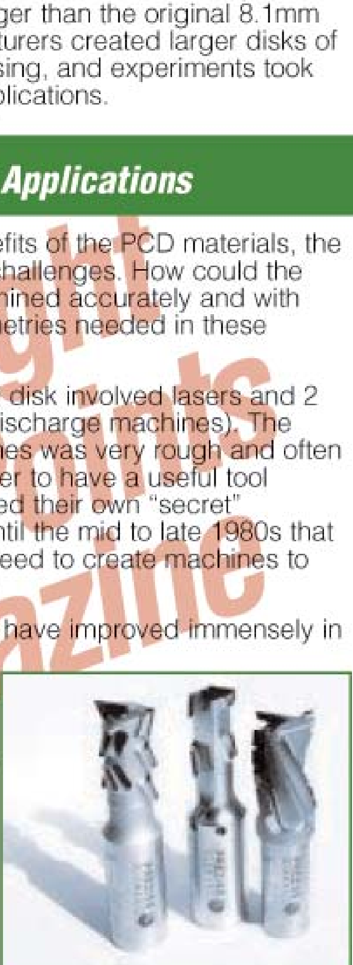

**Photo 1 – *Helical end-mill using planar PCD***

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Photo 2 – *Renishaw Probe Verifying Location of Profiling Tool*

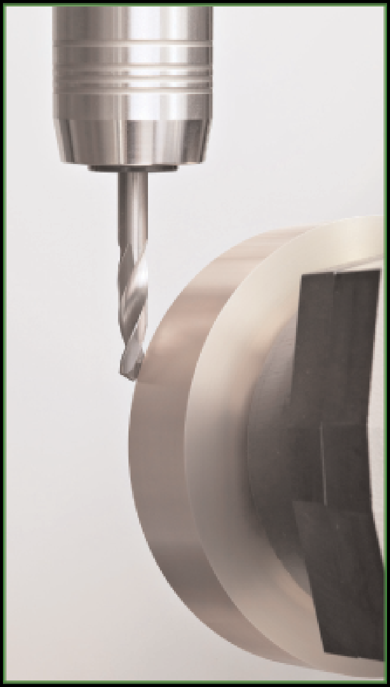


**Photo 3 –** ***Eroding the Gash on Drill, Profile Tool Being Eroded***

## *Processing Drills and End Mills*

Drills and helical end mills (Photo 1) create additional challenges due to fluting requirements and the complex geometries on the diamond edges. The early drills were produced by cutting a notch in an existing drill body and brazing a diamond segment into this channel. The drill would then be finished so that the PCD segment had the correct geometries on the cutting edges. This design was not without flaws as the flat portion of the PCD was difficult to incorporate into the standard fluting designs. The same modifications were also made on helical end mills. PCD segments would be brazed in a crude helical pattern. This pattern would be similar to a series of line segments following the desired helix as opposed to a flowing line.

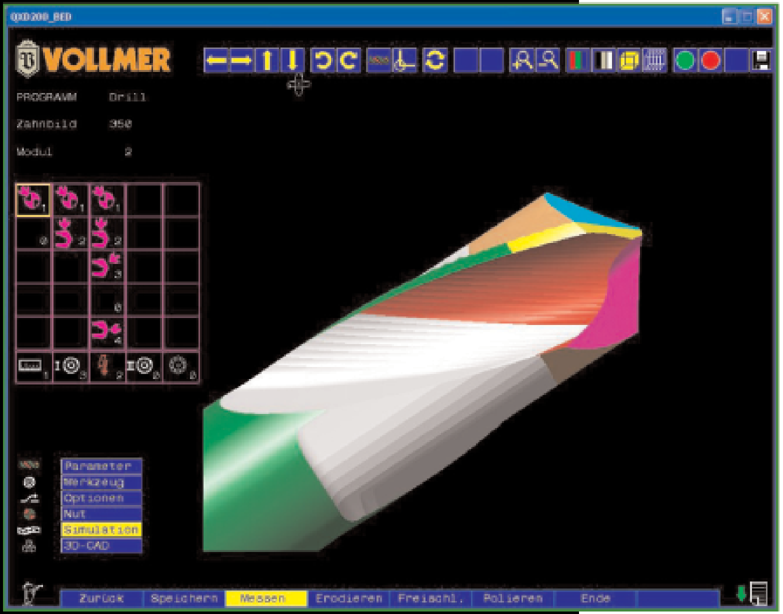
A few of the PCD manufacturers saw that potential existed to optimize parts for these applications and as a result, the veined technology was created. With this technology, grooves are cut into carbide and filled with diamond powder which is then sintered to form a PCD vein. This carbide cylinder, with the included PCD vein is then brazed to a carbide rod for finishing as a drill or end mill. While this design addresses many of the issues associated with the previous shortcomings of the "planar" PCD tips, it still is difficult to process into a finished tool. Most tool manufacturers required at least two machines to complete these tools. One machine erodes the diamond area to a near net shape, and a grinder is used for fluting, and cylindrical grinding. Depending on the application, and damage from the erosion process, another grinding step may be used on the PCD cutting edges.

## *New-Age Machine Tools Meet the Challenge of Finishing PCD*

Many of the challenges in processing PCD tools have been addressed with the newer generation of machine tools. New erosion generators have been developed that complete eroding of the diamond surface and have finishes in the range of .2µ Ra. Tools eroded with surface finishes of this type have been tested successfully in many traditional metalworking applications. In these applications, the elimination of the costs associated with grinding has helped these producers remain much more competitive (Photo 2).

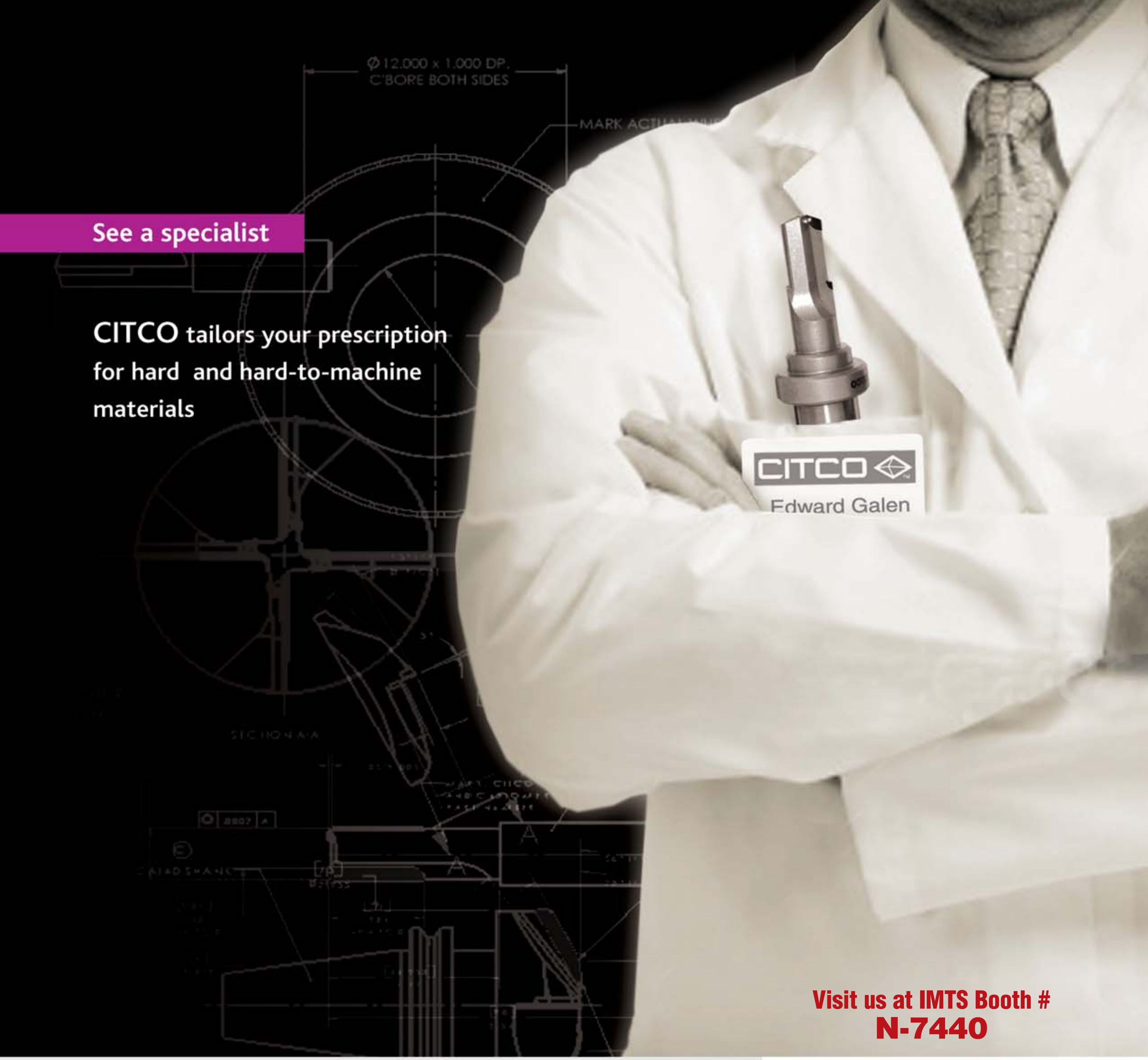
The machine tool builders, as well as tool producers recognize that even though this eroded surface is much improved, it still does not provide the same tool life as a ground part in all situations. For that reason, machines have been developed that are capable of eroding and grinding in the same tool setup. This eliminates the need for a second machine, and helps to reduce variables associated with run out. The elimination of setting up the tool on a second machine, also permits the diamond surface to be eroded to within 10-20µ of final size before the grinding action takes place (Photo 3). This minimal grinding helps to save on wheel wear which also serves to reduce processing costs. CNC technology continues to evolve as well. The newer machines are six axes with all programmable and capable of simultaneous movement. The tool designer now has the ability for the machine tool to reach every segment of the tool increasing creativity and design.

The added ability to program off line utilizing modeling software benefits the tool producer, the sales team, and the end users. Verifying the design on a simulation software package allows the designer to check for any machine collisions prior to actual machining. It allows for the creation and export of the 3D model and normal 2D drawings, these drawings which can be sent to the customer for verification of size, tolerances, geometries etc. The model can also be sent to the end user for verification in any modeling software (Photo 4) used to simulate the processing of



PROGRAMM Drill
Zahnbild 350
Modul 2

*Photo 4 – Drill Simulation*



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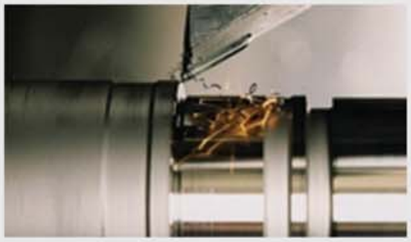

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**Driving progress**

materials. Once the program is created and verified, it is easily downloaded to the machine for processing. Photo 5 shows the drill simulation of the completed drill on the off line software. Each of the colors corresponds to one of the geometries selected in the small purple boxes to the left. Each of the purple boxes represents a module or subprogram which is linked to the main program. These modules can be done in any order so that processing can be optimized.

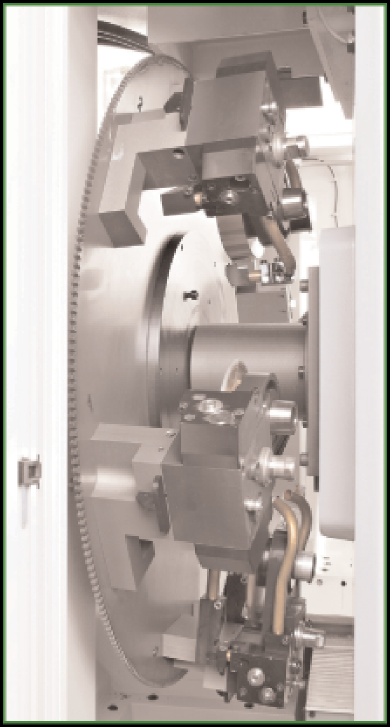

**Photo 5 –** ***Wheel and Electrode Changer***

## *Modular Automation Expands Application Capabilities*

Rising labor costs have also driven the need for automation in many of the production steps associated with PCD tooling. The tool producers have also communicated that they need choices in the types of automation depending on demands and tool requirements from their customers. As a result, the newer machines have been created with a modular approach. This approach provides the tool producer with the option of embracing new technology and expanding the automation systems of the machines as production volumes increase. Modular automation is achieved in two areas. The first area to benefit from automation is the holder for the various electrodes and/or grinding wheels. The ability to hold several designs and change them during the processing cycle, minimizes any operator involvement, once again helping to reduce operating expenses (Photo 5).

The second area of interest in automating the machine tools is in the delivery of the cutting tools to be machined. This is slightly more challenging as PCD tools are common in diameters from 2mm up to 400mm. As expected, the cycle time for processing this assortment of tools also varies dramatically. Automation was developed to address both the size variance with individual pallets which could also be modified to process up to 64 tools (Photo 6). Each pallet carrier also uses RFID technology to identify the tool. This chip is read by the machine so that the correct program is selected when the tool is loaded for processing.

**Photo 6 –** ***Pallet System***

Cost is not the only factor to be addressed in this highly competitive environment. Tool designers and end users have continued to request tighter and tighter tolerances on these cutting tools. Several years ago, tolerances were discussed in thousandths of an inch; today we discuss tolerances in terms of microns. A typical human hair is approximately 75 microns; today requests for tolerances of 5-10 microns are common. The new machine tools are designed to meet these requirements (Photo 7).

***Photo 7 – Vertical Tool Placement, Renishaw Probe on Profile Cutter, Drill Bit Length Being Measured***

## *Improved Machine Technology Reaches Across All Industries*

Although we are in a very competitive market, it is also a very exciting time. Improved alloys in the automotive industries, composite materials used in medical equipment, aerospace and ship building continue to create additional opportunities for the use of PCD tools. The PCD manufacturers continue to introduce new innovative materials, the tool producers develop new designs, and the machine tool builders develop new processing technology. There truly is no end in sight to the things that can be accomplished as we move forward. ■

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# NEWS and notes

## FARNBOROUGH, UNITED KINGDOM, JULY 19, 2010 BOEING CEO SEES MARKET FOR AIRPLANES REBOUNDING

With the Boeing 787 Dreamliner making its dramatic introduction on the international stage, Boeing Commercial Airplanes President and CEO Jim Albaugh said the company is working hard to stay ahead of the competition as the market begins to rebound. He made the remarks in a press briefing to open the Farnborough International Airshow. Albaugh explained: "The market is clearly coming back and I feel very confident about how we are positioned to regain -- and retain -- leadership in this business," Pointing to more than 3,304 unfilled orders for Boeing commercial airplanes as of June 30, we continue to invest in these very successful programs to constantly deliver more value to our customers." With the global economy starting to improve, Albaugh noted an increase in Next-Generation 737 production rates. Contact: Jim Proulx, Boeing Commercial Airplanes - 1 206-766-1393 Jim.proulx@boeing.com

## THE DUKE OF YORK SIGNALS OPENING OF MACH2010 USING RENISHAW TOOL SETTING SYSTEM

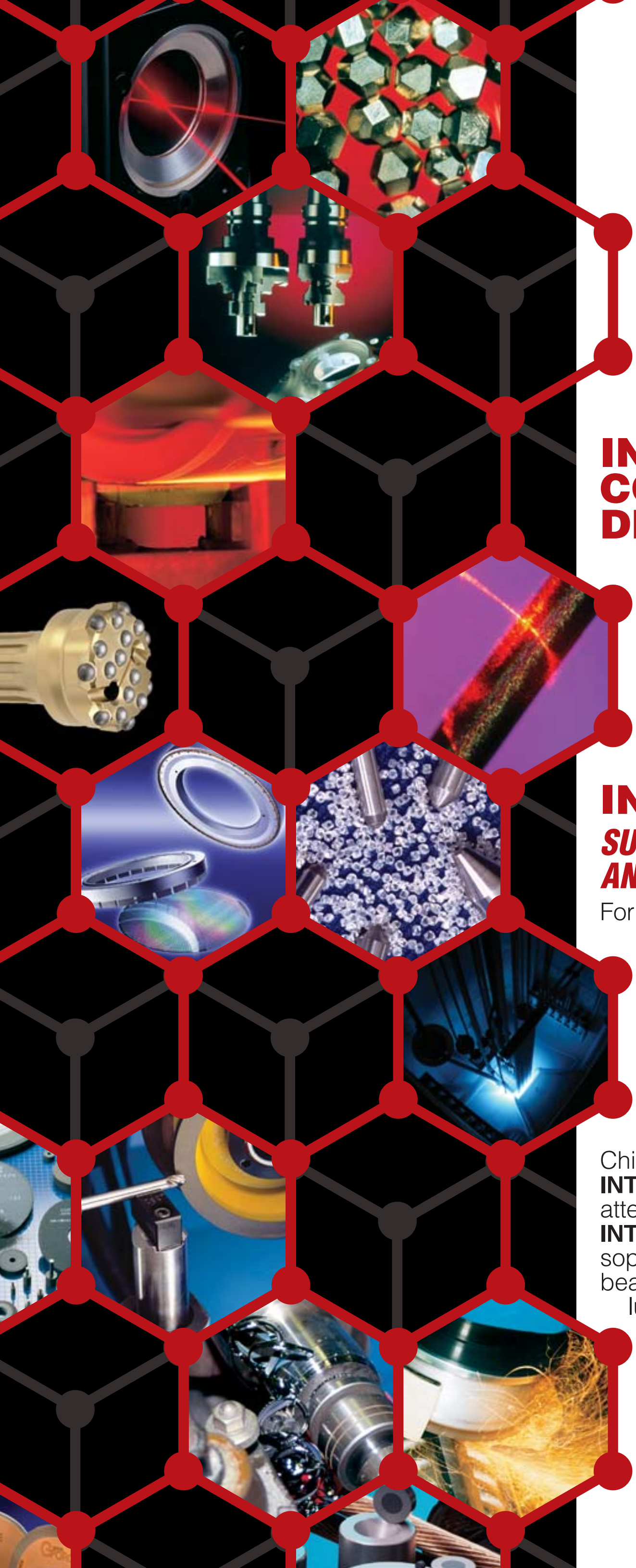
*Birmingham, U.K. June 8, 2010* – Birmingham's National Exhibition Center, His Royal Highness Prince Andrew, The Duke of York, officially opened the UK's MACH2010 exhibition using an advanced laser system manufactured by Renishaw plc. After saying a few words about the importance of the advanced manufacturing sector, the Duke, who is also the UK's Special Representative for International Trade and Investment, passed his hand through a Renishaw NC4 laser tool setting system, which set-off an electronic buzzer to signify that the show was formally open. Graham Shearsmith, MACH 2010 Exhibition Manager, said, "We wanted the official opening to involve something other than a traditional ribbon cutting, and to better reflect the nature of the exhibition. The laser tool setting system is ideal because it is a high-technology product, manufactured by one of our most successful exporting members."

## TWO MAG AUTODRILL SYSTEMS HEADED TO LOCKHEED MARTIN FOR F-35 WING WORK

MAG Industrial Automation Systems has received an order, valued at approximately $7 million, from Lockheed Martin for two 6-axis, CNC-controlled AutoDrill systems to be used in the aerospace manufacturer's Marietta, GA plant. Scheduled for delivery in Q1 2011, the precision automated drilling and trimming systems will use a surface-detecting pressure foot to drill and countersink thousands of fastener holes through complex contoured surfaces comprised of stacked composite materials, aluminum and titanium for the F-35 Lightning II stealth fighter's Center Wing assembly. These are the fourth and fifth MAG AutoDrill systems sold to Lockheed; the other three are located in the company's Fort Worth, TX plant. With manufacturing and support operations strategically located worldwide, MAG offers comprehensive lines of equipment and technologies including process development, automated assembly, turning, milling, automotive powertrain production, composites processing, maintenance, automation and software, and core components. For more information visit: www.mag-ias.com

## *In Memoriam* ... DR. MICHAEL SEAL

Finer Points would like to remember Dr. Michael Seal who died on 3 February 2010 at the age of 79. He researched on diamond for over 50 years and was a respected international expert. Michael's research had involved developments in electron microscopy and applications of these techniques to studies of diamond. He graduated from the University of Cambridge with a PhD degree and joined the Engelhard Hanovia Company in the USA. He became interested in the synthesis of diamond and repeated the experiments of Moissan, the French Nobel Prize winner who carried out experiments in the late 19th Century. Michael reported these experiments and the conclusions at the First International Congress on Diamonds in Industry, held in Paris in 1962. Later, Michael started with D Drukker & Zn Holland, based in Amsterdam. He was responsible for Drukker's research and development on diamond and in the course of his work, developed their micron diamond product range, diamond heatsinks for the electronic industry, diamond optical windows for special applications such as space vehicles and lasers, diamond surgical knives, primarily for ophthalmic applications, and diamond products for other specialist applications. Drukker was also a distributor in Europe for De Beers' industrial diamonds. In the late 1980's, D. Drukker and Zn became a company in the De Beers Industrial Diamond group, so that the new synthetic diamonds, grown both by high pressure, high temperature techniques and by chemical vapour deposition methods, could replace natural diamonds in many applications. Michael was active in this collaboration with De Beers until his retirement, after which he retained an active interest in the fields of diamond research, development and applications, and was a consultant in this field through his company Sigillum. Michael attended over 50 Annual Diamond Conferences and contributed to them all.



**THE INDUSTRIAL DIAMOND ASSOCIATION OF AMERICA IN COSPONSORSHIP WITH GLOBAL ORGANIZATIONS PRESENTS:**

# INTERTECH 2011

*An International Technical Conference on Diamond, Cubic Boron Nitride and their applications.*

www.intertechconference.com

*Hyatt Regency O'Hare*
*CHICAGO, ILLINOIS*
*May 2-4, 2011*

## INTERTECH 2011 WILL BE THE FEATURED CONFERENCE FOR NEW TECHNOLOGY AND APPLICATION DEVELOPMENT OF SUPER-HARD MATERIALS

**INTERTECH 2011** is the leading International Technical Conference on industrial diamond, cubic boron nitride, polycrystallines, CVD diamond, Nanodiamond and other materials classified as superabrasives and ultra-hard materials. This conference will feature presentations on evolving technology, material research and application development and how these materials are applied in various industries. **INTERTECH 2011** will introduce experts from international suppliers, manufacturers, research facilities, academia, end-users, machine tool builders and the scientific community. There will be presentations on subjects that will introduce new and thought-provoking technology on industrial and commercial levels. This will be an international "meeting of the minds" for every aspect of ultra-hard material science. Whether it's revolutionary medical breakthroughs of nanodiamond curing cataclysmic diseases, improved crystals and polycrystalline materials or new inroads for natural and CVD diamond ... This conference covers the complete spectrum.

## INTRODUCING SPECIAL EDUCATION SESSION –

### *SUPERABRASIVE AND ULTRA-HARD MATERIAL ESSENTIALS AND APPLICATIONS*

For the first time at **INTERTECH**, a concurrent one-day session will be offered covering the history, characteristics and proper application for diamond and cubic boron nitride materials. This session is a newly created educational package to address the essentials of superabrasives and ultra-hard materials for those new to the industry or those who wish to become more familiar with the industry and its critical materials and applications.

### *CHICAGO A MAJOR ATTRACTION FOR INTERTECH 2011*

This sensational event will be held from May 2-4, 2011 at Chicago's Hyatt Regency O'Hare in the exciting and entertaining city of Chicago, Illinois USA. The Hyatt Regency has been a major partner of **INTERTECH** for many years and we are anticipating the usual excellent attention and personal service that has become the standard of **INTERTECH** conferences. The Hyatt Regency O'Hare is a modern and sophisticated site and a standard among Chicago hotels. The Hyatt boasts beautiful accommodations, a brand new conference center, new dining choices and luxurious amenities from top to bottom. The Hyatt is conveniently located both to O'Hare airport and nearby Metro service to downtown Chicago for fine dining, world renown shopping experiences, cultural attractions, theaters, clubs, sporting events and amazing sight seeing. This will be a rewarding technical experience complimented by a trip to the world-famous and historic city of Chicago ... **INTERTECH 2011** will be a "have to attend" conference and a memorable experience!

## CALL FOR PAPERS!

**INTERTECH 2011** will be co-sponsored by the leading global Organizations for this industry - Abrasive Engineering Society, The American Ceramics Society, ASM International, Assodiamante, Concrete Sawing & Drilling Association, F.E.P.A., IDA-Americas, IDA China, IDA-India, IDA-Japan, The International Association of Concrete Drillers and Sawers, Japan Society for Abrasive Technology, Society of Manufacturing Engineers (SME), the Unified Abrasive Manufacturers Association (UAMA) and others to be announced. ***You can be part of this exciting event!*** We are now soliciting commercial and technical papers of approximately 30-45 minutes in length that address the research of these super-hard materials as well as the dynamics and application of superabrasive systems in all industries and areas (see: Areas of Consideration) with a focus on new technology, tooling, workpiece materials, machines and applications related to increased **PRODUCTIVITY** and **PERFORMANCE**. Consideration for papers is being made at this time and abstracts are now being accepted; contact us today to be considered. This will be the most comprehensive event ever held on super-hard materials!

## AREAS OF CONSIDERATION FOR PAPERS

**AEROSPACE**
- Manufacturing
- Rebuilding

**AUTOMOTIVE**
- Parts Manufacturing
- Gears
  - Wheels
  - Transmissions
  - Engines

**CONSTRUCTION/ HIGHWAY**
- Concrete Aggregates & Variables
- Highway/Runway
  - – Grinding & Grooving
  - – Bridge Repair
- Renovation
- Block Grinding
- Polishing

**ELECTRONICS**
- Disc Texturing
- Wafer Mfg.
- Polishing
  - Optic Windows
  - Semiconductors
  - Heat Sinks

**EMERGING TECHNOLOGY**
- CVD Diamond
- Nanodiamond
- New Crystals
- Coatings

**GLASS**
- Lens Generation
- Polishing
- Pencil Edging

**MACHINE TOOLS**
- Development
- Innovations
- Advancements
- Superabrasive Adaptation

**MEDICAL**
- Surgical Knives
- Prosthesis Fabrication

**MINING/DRILLING/NATURAL RESOURCE EXPLORATION**
- Drills & Bits
- Application

**NANOTECHNOLOGY**
- Medical Developments
- Industrial Applicatins
- Electronics
- Other Research & Developments

**OTHER MANUFACTURING**
- Pumps
- Motors
- Heavy Equipment

**OPTICS**
- Polishing
- Lens Generation
- Diamond Coating

**RESEARCH & DEVELOPMENT**
- New Crystals & Abrasives
- New Coatings
- Bond Development
- Testing/Gauging
- Tool Fabrication
- Materials
- Tooling
- Application Development
- HPHT Technology
- Film (CVD & PVD)
- Magnetorheological Finishing
- Electrolytic In-process Dressing (ELID) Mirror-Surface Grinding
- Nanotechnology

**STONE PROCESSING**
- Quarrying
- Sawing
- Polishing

**SUPPLIERS TO SUPERABRASIVE INDUSTRY**
- Metals
- Coolants
- Measuring & Gauging
- Safety
- Pressing Equipment

**TOOLING**
- Grinding Wheels
- Cutting Tools
- Sawblades
- Drill Bits

**WEAR PARTS**
- Rests
- Anvils
- Nozzles

**WIRE DRAWING**
- New Technology
- Applications
- Application
- Single Crystal
- PCD
- Manufacturing

**WOODWORKING**
- Hard Woods
- Fiberboard
- Laminates
- Composites

**WORKPIECE MATERIALS**
- Metal Matrix Composites
- Bi-Metals
- High Tech Ceramics
- High Silica Aluminum
- Wood & Wood Composites
- Glass
- Stone
- Concrete
- New Metals & Alloys
- Thermal Sprays
- Superalloys
- Nano-Structured Materials

**OTHER NEW TECHNOLOGY & APPLICATION DEVELOPMENT**

## REGISTRATION MATERIALS FOR INTERTECH 2011 WILL BE MAILED IN 2010 WINTER ISSUE OF FINER POINTS

As you can see by the areas for paper consideration, diamond and cubic boron nitride are not just being used as abrasives in traditional applications. Today, superabrasives and ultra-hard materials are making inroads in electronics, medical, cosmetics and literally every other industry where the characteristics of diamond and cubic boron nitride can affect performance or provide higher strength or new capabilities. As an **INTERTECH** attendee you will learn how these new products and applications are being developed, where super-hard materials are being used and how you can apply these systems in new and innovative ways. See the **INTERTECH 2011** website: **www.intertechconference.com** for additional information on: ● LOCATION & TRAVEL ● SESSIONS & SCHEDULES ● PAPER GUIDELINES ● VISAS AND INVITATION LETTERS ● SPEAKERS & TOPICS ● TABLETOP DISPLAYS ● KEYNOTE ADDRESSES ● ORGANIZING COMMITTEE CONTACTS

**On-Line submission of abstracts is now available at www.intertechconference.com. If you wish to present a paper, you can also send a one or two paragraph abstract of your paper topic via EMail, FAX or regular post to: Terry M. Kane, Chairman • INTERTECH 2011 • P.O. Box 29460 • Columbus, Ohio USA 43229 • Telephone: 614-797-2265 • Fax: 614-797-2264 • e-mail: tkane-ida@insight.rr.com**

# INDUSTRIAL DIAMOND ASSOCIATION OF AMERICA

## MEMBER COMPANIES & IMTS BOOTH # IF EXHIBITING

*Contact an IDA Member Company for superior products and services related to the superabrasives and ultra-hard materials industry. IDA Members follow a strict code of ethics to guarantee quality and dependability. Always buy from an IDA Member!*

**3M Abrasive Systems Division**
Website: www.mmm.com

**ABC & Warren/Amplex Superabrasives**
**IMTS BOOTH# N-7148**
Website: www.saint-gobain.com

**Abrasive Technology**
Website: www.abrasive-tech.com

**Abrasivos Austromex, S.A. DE C.V.**
Website: www.austromex.com.mx

**Action Superabrasive Products, Inc**
**IMTS BOOTH# N-7217**
Website: www.actionsuper.com

**Advanced Abrasives Corp.**
**IMTS BOOTH# N-7238**
Website: www.advancedabrasives.com

**Advanced Superabrasives Inc.**
Website: www.advanced-sa.com

**Allied Machine & Engineering Corp.**
**IMTS BOOTH# W-2034**
Website: www.alliedmachine.com

**American Superabrasives Corp.**
Website: www.diamonds-abrasive.com

**Anco Industrial Diamond Corp.**
Website: www.ancodiamond.com

**Apogee Precision Parts**
Website: www.natchain.com

**Apollo Diamond, Inc.**
Website: www.apollodiamond.com

**Asahi Diamond America**
**IMTS BOOTH# N-7068**
Website: www.asahidiamond.com

**Avure Technologies, Inc.**
Website: www.avure.com

**Bogimac NV-SA**
Website: www.bogimac.com

**Bruce Diamond Corp.**
Website: www.brucediamond.com

**Cdp Diamond Products Inc.**
Website: www.cdpdiamond.com

**Chardon Tool & Supply Co., Inc.**
Website: www.chardontool.com

**Cinetic Landis Corp - Citco Products**
**IMTS BOOTH# N-7440**
Website: www.citcodiamond.com

**Continental Diamond Tool Corp.**
**IMTS BOOTH# N-7172**
Website: www.cdtusa.net

**Darmann Abrasive Products**
Website: www.darmann.com

**Delaware Diamond Knives Inc.**
Website: www.ddk.com

**Desmond-Stephen Mfg Co.**
Website: www.desmond-stephan.com

**Dev Industrial Corp.**
Website: www.dev-group.com

**Diamond Associates**
Website: www.abrasivesmall.com

**Diamond Innovations**
Website: www.diamondinnovations.com

**Dianamic Abrasive Products Inc.**
Website: www.dianamic.com

**Duralor, LLC**
Website: www.duralor.com

**Element Six**
Website: www.e6.com

**Engis Corp.**
**IMTS BOOTH# N-7546**
Website: www.engis.com

**Fort Wayne Wire Die Inc.**
Website: www.fwwd.com

**The Gemesis Corp.**
Website: www.gemesis.com

**Greenlee Diamond Tool Co.**
Website: www.greenleediamond.com

**Hoffman Diamond Products, Inc.**
Website: www.hoffmandiamond.com

**Iljin USA, Inc.**
**IMTS BOOTH# W-2536**
Website: www.iljindiamond.com

**Industrial Diamond Laboratories Inc.**
Website: www.industrialdiamondlabs.com

**K & Y Diamond Ltd**
Website: www.kydiamond.ca

**Lach Diamond, Inc.**
**IMTS BOOTH# W-2139**
Website: www.lachdiamond.com

**Lieber & Solow Co.**
**Lands Superabrasives Co.**
Website: www.lieberandsolow.com,
Website: www.landssuperabrasives.com

**Lunzer Inc.**
Website: www.lunzer.com

**Megadiamond Inc.**
Website: www.megadiamond.com

**Michael Werdiger, Inc.**
Website: www.michaelwerdiger.com

**Microdiamant AG**
**Mypodiamond Inc.**
Website: www.microdiamant.com
Website: www.mypodiamond.com

**Morgan Advanced Materials & Technology**
Website: www.morganplc.com

**Nanyang Zhongnan Diamond Co., Ltd**
Website: www.diamond-zn.com

**National Research Co.**
Website: www.nationalresearchcompany.com

**Niabraze Corp.**
Website: www.niabraze.com

**Noritake Co Inc.**
**IMTS BOOTH# N-6940**
Website: www.noritake.com

**North Jersey Diamond Wheel**
Website: www.diamondwheels.com

**Pinnacle Abrasives**
Website: www.pinnaclesf.com

**Precision Eforming**
Website: www.precisioneforming.com

**Protech Diamond Tool Inc.**
Website: www.protechdiamondtoolsinc.com

**Radiac Abrasives Inc.**
Website: www.radiac.com

**Reishauer Corp.**
**IMTS BOOTH# N-7018**
Website: www.reishauer.com

**Saint Gobain Superabrasives**
**IMTS BOOTH# N-7051**
Website: www.saint-gobain.com

**sp3 Cutting Tools Inc.**
**IMTS BOOTH# W-1489**
Website: www.sp3cuttingtools.com

**sp3 Diamond Technologies**
Website: www.sp3diamondtech.com

**Spec Tool**
Website: www.spec-tool.com

**Standard Die & Fabricating Inc.**
Website: www.standarddie.com

**Sumitomo Electric Carbide Inc.**
**Materials Grp.**
**IMTS BOOTH# W-2422**
Website: www.sumicarbide.com/diamondgroup

**Superabrasives Inc.**
Website: www.superabrasives.com

**Syntech Abrasives Inc.**
Website: www.syntechabrasives.com

**Tomei Corp. of America**
Website: www.tomeidiamond.com

**University of Louisville**
Website: www.cvd.louisville.edu

**US Synthetic Corp.**
Website: www.ussynthetic.com

**Vollmer of America Corp.**
**IMTS BOOTH# N-6751**
Website: www.vollmer-us.com

**Wemex Superabrasivos, S. DE R.L. DE C.V.**
Website: www.wemex.com.mx

**Winterthur Wendt USA**
**IMTS BOOTH# N-7063**
Website: www.winterthurtechnolgy.com

**WMS Trading**
**FACT**
Website: www.wmstrading.com
Website: www.factdiamond.com

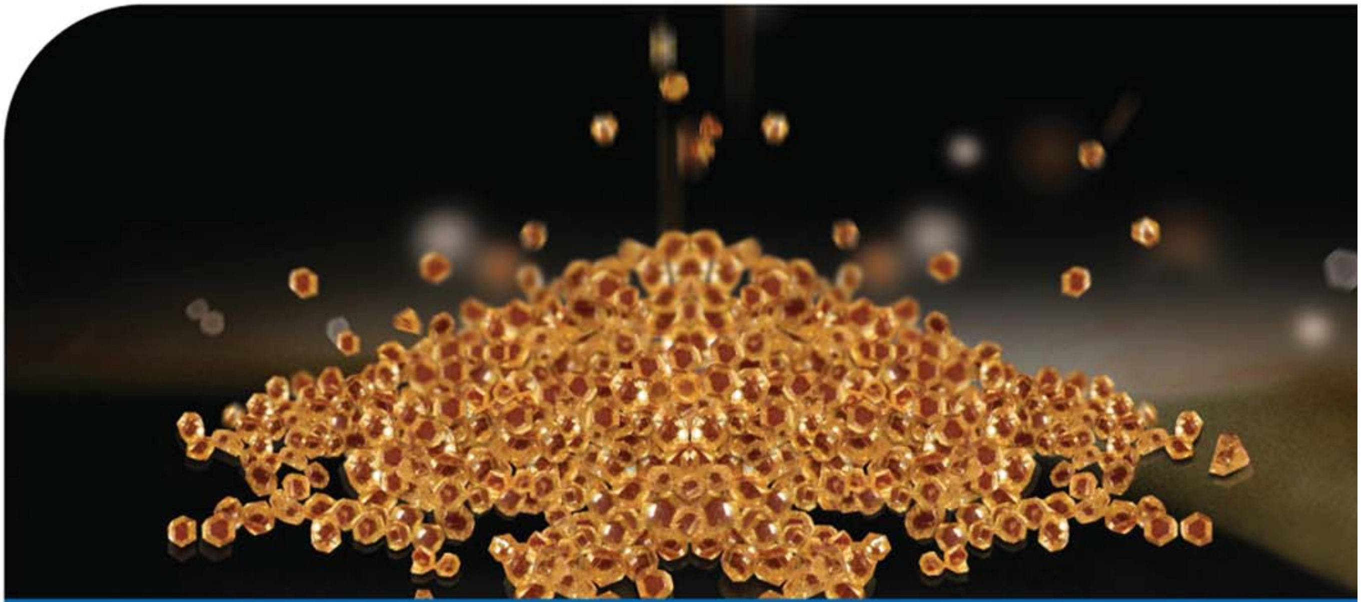
**Worldwide Superabrasives, LLC**
Website: www.worldwidesa.com

**Zhuhai Jujing Diamond Enterprise Co., Ltd**
Website: www.jj-zh.com

**ILJIN Diamond Co., Ltd.**
the Leading Company of Tool Materials.

# CREATE NEW VALUE

**ILJIN Diamond provides customers with exceptional value through superlative quality.**



## Grit Products

- Best Solution for Longer Tool Life & Cutting Performance
- Excellent Thermal & Chemical Stability
- Outstanding Performance to Meet Customers' Needs

| | |
|---|---|
| **IMD** (Metal Bond) | IMD series are engineered to achieve high material removal rate as well as excellent surface finishing, especially for metal bond system. |
| **IRD** (Resin Bond) | IRD series show optimum performance in all bond systems from phenolic to polyimide resin. 30-56wt% cluster and spiky type Ni coating, as well as 50wt% Cu coating are available. |
| **IBN** (cBN) | IBN series are designed for grinding hardened ferrous and superalloy materials. IBN can be applied with a variety of bond systems. Ti and Ni coating are available. |
| **IMP** (Micron Powder) | IMP series are manufactured from premium quality raw materials by cutting edge micronizing techniques (tight PSD, shape and surface control). |
| **ISD** (Saw) | ISD series are available from bloky shape to angular shape to meet all requirements in stone and construction industries. Various Ti based coatings are available. |
| **IPD** (Premium Saw) | IPD series with the highest strength, thermal stability and micro-fracturing property is created by unique synthesizing technologies for the high end market in sawing and drilling. Various Ti based coatings are available. |

## Hard Materials

**Tungsten carbide rods and blanks are materials for machining tools such as endmills, drills and reamers in tooling as well as micro drills such as drill bits and router bits for electronics.**

01 | Excellent wear resistance and toughness by ultra fine WC grain sizes

02 | Various choices from micro(Dia 1.3) to macro(Dia 25.2)

03 | Manufactured by one step sintering-HIP process

## Cutting Tool Materials

- Best Solution for Longer Tool Life
- Extreme Wear & Abrasion Resistance
- Excellent Thermal & Chemical Stability

### ILJIN Polycrystalline Diamond for non-ferrous materials

- Application(Non-ferrous materials) : Al-Si Alloy, Copper Alloy, Carbide, Graphite, Wood, Plastics etc.
- Available Grades : CXL, CM, CMW, CFW, CUF, XUFII

### ILJIN Polycrystalline Cubic Boron Nitride for ferrous materials

- Application(Ferrous materials) : Soft Cast Iron, Hard Cast Iron, Hardened Steel, Powder Metal, Superalloy etc.
- Available Grades: SB95N, SB80, SB70, SB600, SB500, SB100

**Visit us at IMTS Booth #**
**W-2536**

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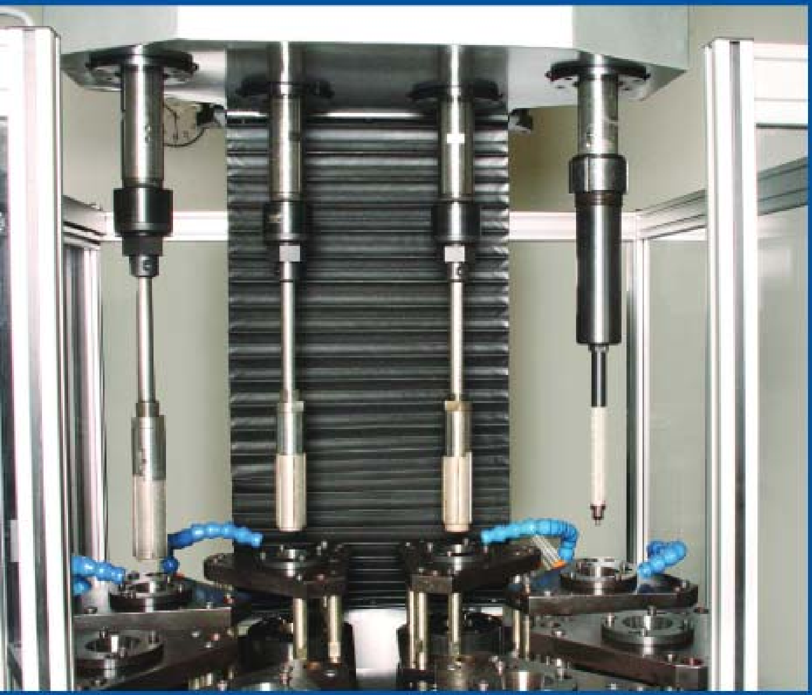
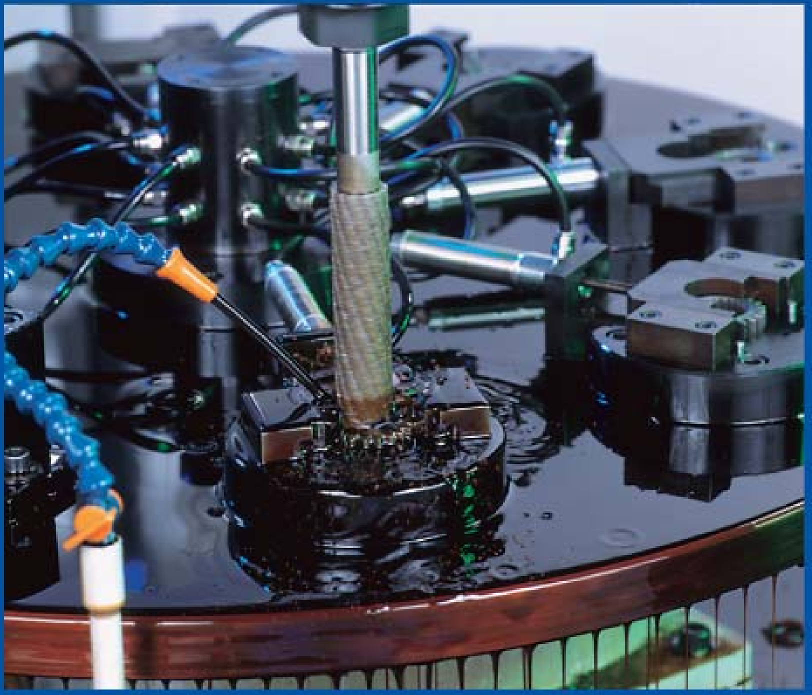
# Superabrasives Come



**Single-pass process involves a series of pre-set diamond coated tools that get passed through a bore with a single in-and-out stroke movement, while the tool, part or both are rotating.**



**The key to the single-pass process is to allow the diamond tooling to follow the existing centerline of the bore to be finished with as little pressure as possible.**

## *A STEP BACK IN TIME...*

When the writer first went to India in 1993, it was to visit an abrasives manufacturing plant near Mumbai and investigate the opportunities for selling the Indian product range into other East Asian markets. While the plant staff was well educated and charming, touring the facility gave one the feeling that one had stepped back in time 40 years, as they were utilizing very primitive equipment and manufacturing techniques. With the potential for considerable product variability inherent within their manufacturing process, the end results were predictable, and no sooner had Indian product arrived at the customer's dock that a call could be expected complaining of poor packaging or shoddy appearance.

## *FAST FORWARD A DECADE AND A HALF*

India is today the largest democracy in the world, it's the 6th largest country, and is one of the most ancient living civilizations (between 10,000 and 34,000 years old, depending on who you believe). Not only did our own numbering system come from India, but algebra, trigonometry, and calculus originated there as well. And India boasts being the largest employer in the world, confirmed by its nationalized railway system, which provides jobs for more than one million individuals.

## *PROTECTIONISM DOESN'T WORK*

At the core of the challenges Indian manufacturers faced back in the 1990s was that it was a highly protected market. This was a dual edge sword while it shielded its manufacturers from global competition, metalworking companies had to make do with rather unsophisticated locally produced products for grinding, polishing, and honing applications. Most of the technology came from Norton or Universal and was decades old, at best. Superabrasives were considered far too costly and generally not suitable due to the poor condition of most Indian machine tools.

## *CHANGE PROJECTS INDIA AS NEXT MANUFACTURING FORCE*

The subcontinent has really come a long way in the last thirty years. While still lagging behind China in terms of manufacturing sophistication, many pundits believe that India may indeed surpass China in the long term taking advantage of a well educated, English speaking pool of engineers and managers, a vast supply of inexpensive labor as well as a democratic institutions and a free press. One example of the changes sweeping the Indian manufacturing sector is a greater willingness to look at total production cost, as showcased by a motorcycle manufacturer located in Pune. India is following down the same path in transportation as many of its Asian neighbors already have, from traveling by foot or on horse cart, to bicycles, then motorcycles, and finally motor vehicles. India currently produces something on the order of 7 million motorcycles per year, which equates to about four motorcycles manufactured per 1000 inhabitants. If they were to achieve the same level as Viet Nam, which manufactures 24 per 1000, this would bring production to a level of something like 42 million units per year. This compares to approximately 1.2 million produced in Japan last year.

## *GREATER PRECISION BY IMPLEMENTING OFFSHORE TECHNOLOGY*

The customer in question began production in 1955 when it started to receive 350 cc kits from the UK for final assembly in India. They eventually began to manufacture the components themselves for assembly into complete motorcycles. As the demand for its

# Of Age in INDIA

By JOHN SMALLSHAW – Engis Corporation

Among the most critical features in any system design is the workholding fixture.

Machine utilizing single-pass bore process with diamond tooling.

products increased, so did need for sophistication of the production processes, and the firm has been awarded not only the ISO 9001 certificate for quality but ISO 14001 for a clean and safe working environment. High precision gears are essential to effective power transmission, lower noise, and the bike's overall performance. The firm's engineering staff presented a challenge to the plant's manufacturing team to achieve greater precision on the gear's bore. The application called for removing 0.050 mm of material from a 20mm diameter gear which was made of steel hardened to 58-64 HRc. The tolerance on the bore called for 0.015mm and the cylindricity needed to be held to 0.008mm with a finish requirement of 0.8Ra. The plant's engineers had first considered attempting to achieve this with conventional honing equipment, which utilizes abrasive stones which expand and contract with each cycle. But they fell short of their quality and cost objectives, which prompted them to begin to look at offshore options. They then contacted a US superabrasive supplier who was able to design a single pass honing system utilizing electroplated diamond tools. The supplier was able to significantly improve upon the results previously achieved with conventional honing. Bore tolerances of 0.007mm, cylindricities of 0.005mm, and finishes of 0.6Ra were achieved consistently in a production environment. This was thanks to a six spindle bore finishing machine which, by double indexing, was able to process two parts at a time.

## TOOLING COST REDUCED & PREFORMANCE IMPROVED

The electroplated honing tools allow for greater exposure of the diamond particles in the process than bonded products, which resulted in a cooler cut and extremely long tool life. The previous process required the conventional honing machines to be shut down every 2000 parts to change out the tooling, whereas the plated diamond tools could routinely finish 60,000 pieces. Since the tooling finishes the full periphery of the bore, interruptions such as keyways or splines do not adversely affect the performance. The total cost to the customer on finishing each part is less than $0.01 US, which effectively reduced the cost of just the tooling by 50%, not to mention a reduction in the number of rejects and increased manufacturing efficiencies.

## INDIA RECEPTIVE TO SUPERABRASIVE MANUFACTURING SYSTEMS

Based upon these results, the Indian firm purchased American made two single pass honing systems, and is now finishing 14,000 gears on a daily basis. This success is an indication that manufacturers in India are more receptive than ever to superabrasive products and systems, even when they come from an offshore source. As the standard of living in India improves, it has stimulated an increased the demand for quality manufactured goods. This trend provides a fertile environment for superabrasive applications to continue to grow, as has been demonstrated by the case study of the Indian motorcycle manufacturer. ■

Engis®
*Leaders in Superabrasive Finishing Systems*

***Engis Corporation will be demonstrating their machine tools at the International Manufacturing Technology Show (IMTS) and would welcome any questions of their systems and processes at Booth #N-7546. Or, call direct at 847-808-9400, www.engis.com***

# Calendar of EVENTS

*To have your event or conference listed, please send information to: Finer Points Event Calendar • P.O. Box 29460, Columbus OH 43229 • Fax 614-797-2264 or email: tkane-ida@insight.rr.com*

**August 25-28, 2010**
**International Woodworking Fair 2010**
Atlanta, Georgia
www.iwfatlanta.com

**August 29-September 1, 2010**
**11th International Conference on Ceramic Processing Science (ICCPS-11)**
Zürich, Hönggerberg
www.ceramics.org

**September 5-9, 2010**
**Diamond 2010**
21st European Conference on Diamond, Diamond- Like Materials, Carbon Nanotubes, and Nitrides
Budapest, Hungary
www.diamond-conference.elsevier.com

**September 13-18, 2010**
**IMTS 2010**
McCormick Place
Chicago, IL
www.imts.com

**September 28-October 1, 2010**
**GLASSTEC – Germany**
Dusseldorf, Germany
www.glasstec-online.com

**October 26-30, 2010**
**EuroBLECH 2010**
21st International Technology Exhibition for Sheet Metal Working
Hanover Exhibition Grounds
Hanover, Germany
www.euroblech.com

**September 29-October 2, 2010**
**MARMOMACC 2010**
Exhibition for the Marble and Stone Industry
Verona Exhibition Centre
Verona, Italy
www.veronafiere.it

**October 28-November 2, 2010**
**JIMTOF – Japan International Machine Tool Fair**
International Exhibition Centre
Tokyo, Japan
www.jimtof.org/eng

**November 2-3, 2010**
**Aero Engineering USA**
The Pasadena Convention Center
Pasadena, California
www.aeroconf-usa.com

**November 29-December 2, 2010**
**The 9th International Exhibition on Internal Combustion Engine**
National Convention Center
Beijing, China
http://www.automobilindustrie.vogel.de/fileserver/vogelonline/files/3001.pdf

## CALENDAR EVENTS for 2011

**January 17-21, 2011**
**World of Concrete**
Las Vegas Convention Center
Las Vegas NV
www.worldofconcrete.com

**January 17-21, 2011**
**Diamond Award 2011**
**The International Association of Concrete Drillers & Sawers (IACDS)**
Las Vegas Convention Center
Las Vegas NV
www.iacds.org

**January 23-28, 2011**
**35th International Conference and Exposition on Advanced Ceramics and Composites-ICACC'11**
Hilton Daytona Beach Resort
Daytona Beach, FL
www.ceramics.org

**January 25-27, 2011**
**STONEXPO 2010**
International Exhibition for Natural Stone Industry
Mandalay Bay Convention Centre
Las Vegas, NV USA
www.stonexpo.com

**April 19-21, 2011**
**Precision Machining Technology Show PMTS**
Greater Columbus Convention Center
Columbus, OH
www.pmts.com

**April 30-May 1, 2011**
**Industrial Diamond Association ANNUAL MEETING**
Hyatt Regency O'Hare
Chicago, Illinois
www.superabrasives.org

***Watch for Details***

## *INTERTECH 2011*

**May 2-4, 2011**
Hyatt Regency O'Hare
Chicago, Illinois

INTERTECH 2011
An International Technical Conference on Diamond, Cubic Boron Nitride and their applications.
www.intertechconference.com
Hyatt Regency O'Hare
CHICAGO, ILLINOIS
May 2-4, 2011

www.intertechconference.com

***Watch for Details***

**May 6-8, 2011**
**IACDS Annual Meeting 2011**
Bruges/Belgium
www.iacds.org

# The PCD Advantage in the MACHINE TOOL INDUSTRY

P.J. AGNEW
*Sales Application Engineer – Metalworking • Lach Diamond, Inc.*

Photo 1 – MONOBLOCK FACE MILL

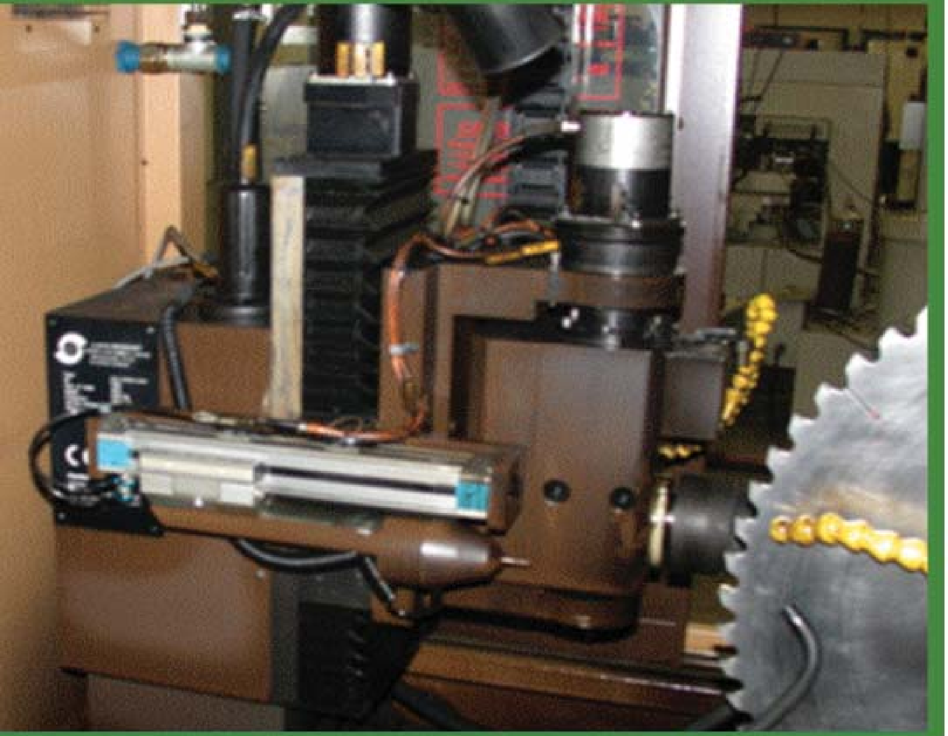


Photo 2 – GRINDING THE DIAMETER AND PERIPHERY OF PCD CUTTING BLADES

Photo 3 – PCD INSERTS

## SUCCESSFUL COMPANIES MAINTAIN STANDARDS

Supporting industries like wind power, automotive, aerospace, woodworking, medical, optical, and others demands consistency. To exceed these industries expectations and needs requires innovation. Relationships developed with customers not only are revealed through product abilities, but through comprehensive support. By focusing on these key elements, successful companies have maintained a standard in the PCD (Polycrystalline Diamond) and CBN (Cubic Boron Nitride) tool industry that is impressive.

## PCD IS THE CLEAR CHOICE

Machine shops that mill, turn, or drill non-ferrous materials like aluminum and composites are finding PCD to be a logical choice over carbide simply because of its tool wear resistance. It's not uncommon to see 30, 40, even 100 times the life over carbide in these materials. It's a very cost effective option, especially in a production environment. PCD is the clear choice when machining high silicon (>12%) aluminum, glass & carbon fiber composites, green carbide, graphite, and other highly abrasive materials.

## "GREEN ENERGY" AND EFFICIENT MANUFACTURING PROCESSES

One area a diamond tooling company is revealing its pioneering strength is in the wind power industry. These companies work with "green energy" manufacturers and their machine builders to produce productive, cost effective PCD mills and drills, along with diamond coated saw blades. Products that definitely help allow efficient manufacturing processes to move forth in the industry. The latest technology is the creation of a PCD Monoblock mill (photo 1) that has the ability to rough and finish machine the composite materials used in turbine blade production. This brazed PCD tool does not use indexable inserts and there are several advantages in this technology. One is that the mill is ready to fixture in the machine with no additional indicating or balancing required. Second, although an indexable cutter can be indicated in, there is always tolerance in mill pockets and insert geometry that need to be addressed for fine finishing needs. These mills can achieve an RZ surface finish better than 3µ. Third, since the Monoblock style mill uses no hardware such as screws, locaters, cartridges, including inserts, there is less chance of a component failing. The same benefits are applicable to their brazed PCD drill products.

Photo 4 –
HIGH SHEAR/HIGH PERFORMANCE CUSTOM DESIGN ROUTER BITS

Photo 5 – WOODWORKING COVE PROFILE RAISED PANEL CUTTER

## DECADES OF PRODUCT DEVELOPMENT

So how does a diamond company produce quality tooling and offer support that sets the standard in the industry? It all started in 1922 when the company was involved in cutting and grinding diamonds into precious jewelry. 1932 was the year that industrial diamond was added to the operations until 1950 when the focus shifted solely to industrial diamond applications. The 60's and 70's brought strong growth with innovations and awards. From manufacturing grinding wheel technological advancements to being the pathfinder of PCD turning and milling tools, the company became a "who's who" in the industrial diamond market. This tradition continued for the next two decades through the millennium and discovering using PCD for wood working, wood-like materials, and plastics machining utilized in the furniture and flooring industries.

## MANUFACTURING HIGH QUALITY PRODUCTS

The industrial diamond (PCD) market has grown over the last decade. There was a time when only a few companies were producing PCD substrates. Those diamond companies focused on manufacturing only high quality products. These days there are many more diamond companies in competition which creates a broader spectrum of quality concerns. Still, there are a few companies that have not compromised their quality standards, producing quality PCD in various grades. They are the epitome in the abrasive diamond industry who strives for the best of the best. These companies invest in new technologies to design new grain structures, binder methods, and correlating different grain sizes – different grades. Successful companies pass this technology down to the customer by designing the tool and matching the proper diamond grade to the operation it will be applied. By only using the highest quality diamond products available in the world, they continue to produce the cost effective and consistent tooling needed in today's growing manufacturing industry.

## QUALITY PERSONNEL AND HI-TECH MACHINES EQUAL PRECISION TOOLS

Of course, a company must have the best equipment, and people, to properly

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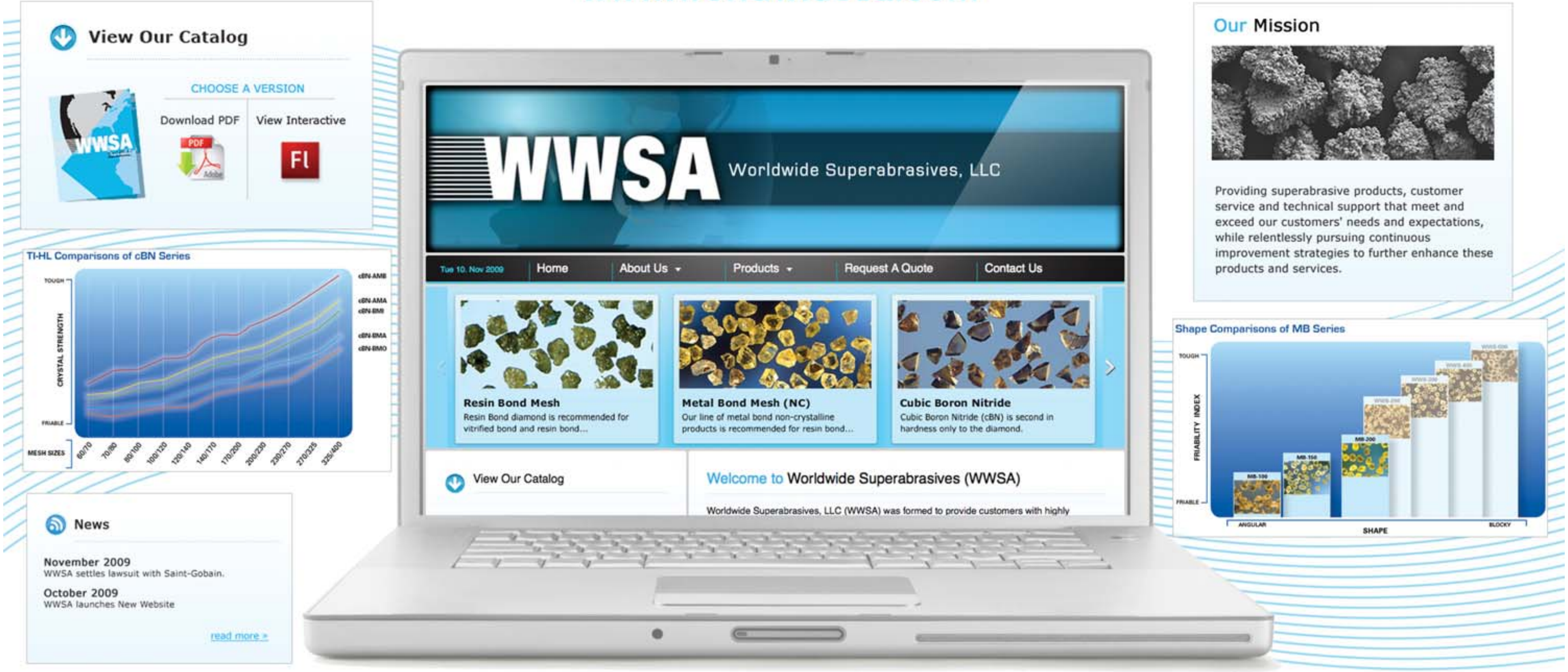
# WWSA Launches New Website

## www.worldwidesa.com



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WWSA settles lawsuit with Saint-Gobain.

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Our line of metal bond non-crystalline products is recommended for resin bond...

**Cubic Boron Nitride**
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Our Mission

Providing superabrasive products, customer service and technical support that meet and exceed our customers' needs and expectations, while relentlessly pursuing continuous improvement strategies to further enhance these products and services.

Shape Comparisons of MB Series

## NEW FEATURES

**The updated website offers intuitive navigation** with easy to find product information, an improved graphical user interface that is visually pleasing and an interactive WWSA product catalog.

**The new WWSA catalog features an expanded product line,** greater application details for end users and a brief overview of our manufacturing processes and quality assurance program.

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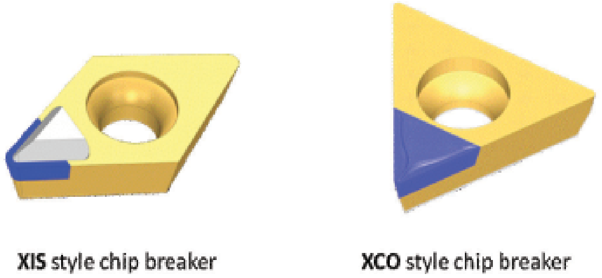
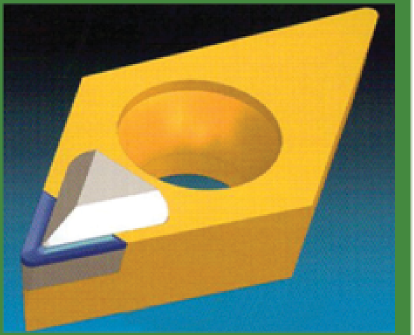
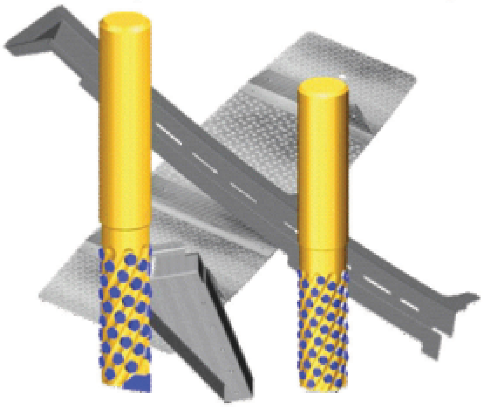

**XIS** style chip breaker

**XCO** style chip breaker

Graphic 1 –
TWO NEW CHIP BREAKER STYLES



Graphic 2 – TOOL WORKS WELL IN LESS RIDGID SETUPS BECAUSE IT IS VERY FREE CUTTING UTILIZING A MORE RAKED LASER CHIPBREAKER, BUT ALSO INCORPORATING THE TOP BREAKER TO BREAK THE CHIP



Graphic 3 –
PLUNGE CAPABLE PCD ROUGHING MILL

DISPOSABLE DESIGN COMPRESSION ROUTER BITS OFTEN ABLE TO BE RESHARPENED

cut the PCD or PCBN to net shape precisely for the tool it is applied to using specific EDG (Electrical Discharge Grinding) and wire EDM (Electrical Discharge Machine) equipment to process this need. Another important machine used is the PCD specific grinding machine. The company designed PCD specific machines described above to ensure the highest standard. Examples are shown in the newly manufactured grinding machines. Another key tool building and service that the company prevails on the forefront is PCD cutting blades. There is a special new CNC machine (photo 2) which becomes a valuable player when it comes to grinding the diameter and periphery of the blade. Its probing capability assures a perfectly ground PCD on each tooth in relation to the Cutting blade's steel body.

## TOOLING MODIFICATIONS MEET NEW APPLICATION NEEDS

When a company's focus is 95% special tooling, it is able to adjust to the customer's need by not only producing new tooling for a specific task, but also by being able to take an existing tool and modify it for any PCBN or PCD application. Just about any proprietary turning or milling insert, even indexable drilling inserts, can be modified to be PCD or PCBN tipped depending on the operation task (photo 3). This is especially true in wood working were many different profiles and shapes are prevalent in today's product choices. In the metal working industry, the ability to have a custom tool for a specific shape, known as form tools, is also valuable in decreasing machining time and promoting consistency from one part to another. Most of these form tools are made from carbide, which, for an immediate cost saving is fine, but after a number of parts, the cutting edge deteriorates causing dimensional and service finish concerns. With high silicone aluminum, and depending on the production run, PCD could be a substantial cost saver.

## INDUSTRY FIRSTS AND AWARD WINNING TOOLING

Another frontier first in the diamond tooling industry is the development of PCD & PCBN chipbreaker tools (graphic 1) for ferrous and non-ferrous applications. These patented tools eliminate long stringy chips using either a top style chipbreaker or the latest laser etched chipbreaker. These advancements in PCD geometry and laser applications basically force the material being machined to curl into itself more abruptly causing the chip to break off. If the work piece is thin and less rigid, there is another chipbreaker (graphic 2), using both technologies, which can be employed. Surface finish and chip control are especially important in boring applications where using non-chipbreaker tooling can create a "bird's nest" of chips that is undesirable.

Just recently, another new technological development was given an award for dynamic engineering product development. The prestigious AIRTECH Award was given to the plunge capable roughing mill for composite materials. The mill, with unique multiple PCD placements (graphic 3), can machine sensitive glass fiber reinforced or carbon fiber reinforced composite materials.

## DIAMOND TOOLING BECOMES THE INDUSTRY STANDARD

As mentioned earlier, there have been great advancements with PCD in the wood working industry. Innovative and newly developed router bits (Photo 4), used in various contouring, jointing and grooving, combine the benefits of PCD with less cost. Though there will always be a place for conventional tooling, such as high speed steel and carbide, diamond tooling has rapidly become the "industry standard" in more applications. This particularly applies to high production requirements and where profile consistency is necessary. Industry examples include cabinetry, flooring, store fixtures and furniture to name a few. Most tool types made of carbide can be made with diamond, but may have different geometries and number of teeth. With the abrasion resistance being 125 times greater than that of tungsten carbide, PCD will often yield 50-300 times the tool life. Though the initial cost will be higher than carbide, PCD will often offer a payback before it requires sharpening for the first or second time, being more cost-effective. Because diamond runs for so long between sharpenings, there is much less downtime for tool changes or adjustments and less downtime means more productivity.

Industrial Diamond Association of America, Inc.

# MEMBERSHIP APPLICATION

Company ______________________ Address ______________________
City ______________________ State ______ Zip Code/Postal Code ____________ Country ______________
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City ______________________ State ______ Zip Code/Postal Code ____________ Country ______________
Phone ______________________ Fax ______________________
E-mail ______________________ Web Site ______________________
Official Representative ______________________
Others (Participating in IDA Activities) ______________________
Principle Business Activity ______________________
Which applies to your company: ______ Corporation ______ Partnership ______ Sole Proprietorship
Provide names of principle officers or partners: ______________________
When was your company established? ____________
How long has your company been engaged in superabrasive/ultra-hard material industry? ________
List at least two business references, preferably one is an IDA member (name, company and address of each):
1. ______________________
2. ______________________

**CHECK APPROPRIATE MEMBERSHIP**

______ **Regular Membership**

Any company and/or individual classified as a superabrasive/ultra-hard material supplier, tool maker, machine tool builder, end user or related business with offices in the USA, Canada or Mexico is eligible in this category. Only one individual shall be designated by each member company as the IDA Delegate with voting and other privileges described in the By-Laws.

**(DUES CATEGORY)**

The dues category for Regular Members is determined by annual sales volume expressed in US $ as indicated below.

Check to appropriate category:

| | | | |
|---|---|---|---|
| _____ | Category 1 | $2,575 per year | Over $20,000,000 Annual Sales |
| _____ | Category 2 | $1,936 per year | $10,000,000 - $19,999,999 Annual Sales |
| _____ | Category 3 | $1,709 per year | $6,000,000 - $9,999,999 Annual Sales |
| _____ | Category 4 | $1,328 per year | Under $2,000,000 - $5,999,999 Annual Sales |
| _____ | Category 5 | $975 per year | Under $1,999,999 Annual Sales |

Name of Delegate Voting Member: ______________________
Title: ______________ E-Mail: ______________

______ **International Membership**

Any company and/or individual classified as a superabrasive/ultra-hard material supplier, tool maker, machine tool builder, end user or related business which does not have offices or other facilities in the USA, Canada or Mexico is eligible in this category. An International Member shall have all the privileges of regular membership, except that the delegate cannot vote at any membership meetings, participate in statistical reporting for the North American market, hold proxies or serve in any office in IDA. Annual fee for International Member is **$2,575 per year**.

Name of Delegate Voting Member: ______________________
Title: ______________ E-Mail: ______________

______ **Associate Membership**

Available for companies having a principal office in the USA, Canada or Mexico, which are providing products or services to the superabrasive/ultra-hard material industry, but are not engaged in selling, using or dealing in industrial diamonds, cubic boron nitride, compacted diamond/cbn, diamond film or products containing diamonds/cbn. An Associate Member shall have all the privileges of regular membership, except that the delegate cannot vote at any membership meetings, participate in statistical reporting for the North American market, hold proxies or serve in any office in IDA. Annual fee for Associate Member is **$500 per year**.

Name of Delegate Voting Member: ______________________
Title: ______________ E-Mail: ______________

______ **Affiliate Membership**

Each company that enrolls as a Regular or International IDA Member is entitled to have a second person at that company designated an Affiliate Member. The first Affiliate member will receive IDA material at no further cost. Additional persons at Member companies can be added as Affiliate Members to receive IDA materials. Annual fee for Affiliate Member is **$75 per year**.

Name of 1st Affiliate Member (no charge): ______________________
Name of 2nd Affiliate Member ($95): ______________________
Name of 3rd Affiliate Member ($95): ______________________
If more than 3 Affiliate Members, please attach separate sheet.

______ **Education/Research**

Any individual having an affiliation with a non-profit educational institution or Research & Development organization is eligible for membership in this category. An Education/Research Member shall have all the privileges of regular membership, except that the delegate cannot vote at any membership meetings, participate in statistical reporting for the North American market, hold proxies or serve in any office in IDA. Annual fee for Education Member is **$125 per year**.

______ **Senior Membership**

Available for any individual who has retired or is no longer active in the diamond or cbn business, but wishes to receive information mailings and attend IDA meetings as a member. Annual fee for Senior Member is **$50 per year**.

## WHAT IS THE IDA?

***The Industrial Diamond Association of America, Inc.*** **is a non-profit trade association and was incorporated on March 29, 1946 in the State of New York. It is the oldest and most prestigious association in the superabrasive/ultrahard materials industry. Activity and focus has evolved from natural diamond to superabrasives and most recently, to all ultrahard materials including CVD Diamond. Members include material suppliers, tool manufacturers, component producers, machine tool builders, end users, academia/research affiliates and other companies related to the research, manufacture, application, use and sales of superabrasives.**

### WHAT DOES THE IDA DO?

- Oversees Statistics Reporting Program
- Establishes Industry Standards
- Interacts With Global Associations And Organizations
- Creates And Distributes Market Studies & Data
- Organizes And Presents Technical Seminars & Conferences
- Serves As A Government Liaison For Industry Guidelines And Regulations
- Participates As Member Of World Diamond Council
- Provides Safety / Regulatory Reports And Advisement
- Resource For General Information And Consultation

### OTHER MEMBER SERVICES

- PUBLISHES QUARTERLY MAGAZINE
- HOLDS ANNUAL CONVENTIONS
- HOSTS IDA WEBSITE WITH MEMBER FOCUS AND DIRECTION
- PROVIDES SPECIFIC ASSISTANCE ON INDIVIDUAL MEMBER ISSUES
- CREATES AND DISTRIBUTES PUBLICATIONS ON PRODUCTS AND APPLICATIONS
- ACTS AS A COLLECTIVE VOICE FOR INDUSTRY CONCERNS

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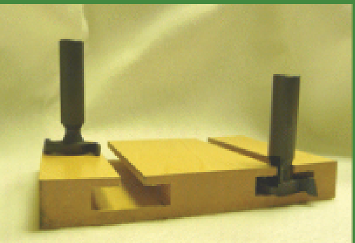
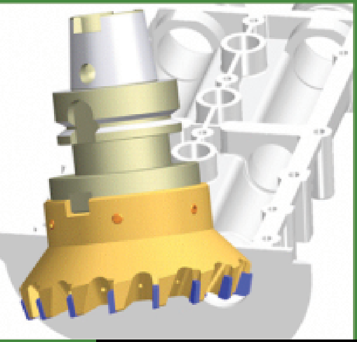


WOODWORKING T-SLOT CUTTERS – AVAILABLE IN VARIOUS SIZES

PROFILE ROUTER BITS – INSIDE & OUTSIDE PROFILES FOR SINGLE PIECE DOORS.



PROFILE ROUTER BITS – INSIDE & OUTSIDE PROFILES FOR SINGLE PIECE DOORS.

## DIAMOND TOOLING PROVIDES A SMOOTHER FINISH

Another advantage of using diamond in woodworking (photo 5) is that less sanding and other subsequent operations are often realized. With today's highly automated machinery, along with the wide use of composite materials, such as medium and high density fiberboard (MDF and HDF), particle board (PB), oriented strand board (OSB) and various laminate types, diamond tooling is required more than ever before. These composites, composed of wood and wood by products, resins and minerals, are much more abrasive than natural woods and cause conventional tooling to dull quickly.

In addition, the innovation of disposable tooling or tooling designed for a limited number of sharpenings has made diamond tooling much more affordable, especially benefiting small to medium size companies. Due to its reduced cost and ability to provide tremendous cost savings, diamond tooling has more than proven itself in the cutting tool industry.

Using both digital and optical comparator equipment, tolerance of tools can better than +0/-.0002″ (5µ). In house tool body manufacturing capability is another advantage that supports utmost quality control and expedited needs. Depending on the tool, in most cases, a three to four week lead time to design and manufacture a tool is the norm. Servicing, as in retipping and reconditioning tools, is a one to two week operation. This is also applicable to competitor tooling that finds its way to another manufacturer. By continuing innovations needed in the future for growing industries machining non-ferrous, composite, plastics, wood and wood like materials, PCD can be counted on again and again. ■

*LACH DIAMOND will be showcasing some of its products at the International Manufacturing Technology Show (IMTS) and would welcome any questions concerning PCD or PCBN machining. Or, they can be reached direct at 800-522-4872, sales@lachdiamond.com.*

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# Announcements & PRODUCTS

CITCO
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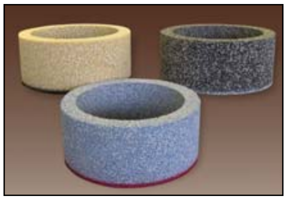
## NEW PRODUCTS FOR GRINDING TO BE INTRODUCED AT IMTS-2010 BY CITCO & GARDNER ABRASIVES



CITCO Diamond & CBN Products and Gardner Abrasives will introduce several new products for grinding applications on booth N-7440 at IMTS-2010, Sept. 13-18 in Chicago, Illinois. Featured products will include the new CITCO XL-2010 dressing system and GammaGrind™ grinding wheels from Gardner Abrasives. The XL-2010 is a highly engineered dressing system designed to eliminate dressing tool break-in time for centerless, angle-head and other grinder applications. The XL-2010 can be ordered with hand-set diamonds in a specific pattern for consistency in high precision applications, or random dispersion for applications requiring less precision. The XL-2010 is a long lasting, low maintenance, high productivity dressing system appropriate for a wide range of grinding applications, from small I.D. wheels to large centerless and cylindrical wheels. Gardner Abrasives will also introduce its new line of GammaGrind™ abrasive wheels with Alpha-Pore™ Technology for applications requiring high material removal. "Alpha-Pore" technology produces wheels with an extraordinarily large porosity that contributes to exceptionally free cutting performance, enabling GammaGrind wheels to be used in very aggressive grinding applications. **More information visit www.fivesgroup.com/tools**

ILJIN
Diamond

## ILJIN DIAMOND CO., LTD. HAS LAUNCHED TWO NEW POLYCRYSTALLINE PRODUCTS FOR IMTS 2010 IN CHICAGO

One is IBON-SB600 with low content cBN for the hard machining of hardened steels, and the other is IPOL-XUF II with a submicron diamond grain. IBON-SB600 is engineered to offer excellent thermal stability, fatigue strength and toughness, which are required characteristics for hard machining. IBON-SB600 is suitable for continuous to moderately interrupted hard machining operations on hardened steel. IPOL-XUF II has about 90% of diamond content with average grain size below 1 um. Thanks to the proprietary production process, its microstructure shows uniform distribution of grains and metallic binders. Unlike other PCD grades, IPOL-XUF II has both high wear resistance and high impact resistance due to densely sintered structures.

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## HIGH PERFORMANCE TOOLHOLDER FOR MICRO MACHINING

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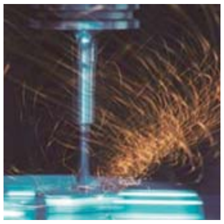

SCHUNK is offering the TRIBOS-RM precision toolholder as the best solution for micro machining with the ISO interface. The one-piece, rotationally symmetric design ensures long life of the machine spindles and the complete transmission of power. Compared with heat shrink clamping, the TRIBOS-RM scores full points with steady tool clamping that will not distort the toolholder. The user will always benefit from a precise run-out accuracy of less than 0.003 mm, which is perfect with small tools for micro machining. The TRIBOS-RM is designed for high spindle speeds of up to 60,000 rpm in high-speed cutting, making it ideal for the high speeds involved in micro-machining. Sizes ISO 10 D 1 - 6 mm are available. The balancing grade is G 2.5 at 25,000 rpm. **For more information, visit www.schunk.com**

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Zip/Postal __________________ Telephone ________________________ FAX ______________________
Email ______________________________________________________________

## 2010 ADVERTISING RATES

***Please check size of advertisement desired. You will be invoiced***

| ***Frequency*** | **1X** | **4X** |
|---|---|---|
| Full-page, 7-1/2"W x 10"H, 4 Color | $2110____ | $1820____ |
| Full-page, 7-1/2"W x 10"H, Black/2nd Color | $1820____ | $1530____ |
| Full-page, 7-1/2"W x 10"H, B & W | $1570____ | $1425____ |
| Half-page, 5"W x 7-1/2"H, Four Color | $1240____ | $1090____ |
| Half-page, 7-1/2"W x 5"H, Four Color | $1240____ | $1090____ |
| Half-page, Either Size, Black/2nd Color | $1090____ | $ 950____ |
| Half-page, Black & White | $ 950____ | $ 875____ |
| 1/3 page, 2-3/8"W x 10"H, 4 Color | $1020____ | $ 950____ |
| 1/3 page, 2-3/8"W x 10"H, B & W | $ 875____ | $ 825____ |
| 1/4 page, 4-3/4"W x 4-3/4"H, Color | $ 825____ | $ 800____ |
| 1/4 page, 4-3/4"W x 4-3/4"H, B & W | $ 750____ | $ 725____ |
| Back Cover, Full-page, 4 Color Only | 4X Only | $2985____ |
| Inside Front Cover, Full-page, 4 Color Only | 4X Only | $2839____ |
| Inside Back Cover, Full-page, 4 Color Only | 4X Only | $2766____ |

**Additional Charges (non-commisionable):**

| | |
|---|---|
| BLEED (full page - 8-3/4" x 11-1/4") | $125 additional charge____ |
| PAGE SELECTION | $175 additional charge____ |

**IDA MEMBER RECEIVES 10% AD DISCOUNT**

Classified ad rates are Non-commissionable $85. members/$125. non-members ________ All 2-1/4"W x 2-1/4"H

## 2010 EDITORIAL CALENDAR

***Planned issues, topics and closing dates:***

| **Issue:** | **Editorial Feature*:** | **Closing** |
|---|---|---|
| Spring 2010 | Superabrasives Resource Directory | Mar. 15, 2010 |
| Summer 2010 | Nanotechnology & Materials | May 15, 2010 |
| Fall 2010 | IMTS Preview & Machine Tools | Aug. 15, 2010 |
| Winter 2010/2011 | INTERTECH 2011 Program & Registration Packet | Nov. 15, 2010 |
| Spring 2011 | INTERTECH 2011 Presentation Preview | Feb. 15, 2010 |

*Editorial topics subject to change

## SHIPPING INSTRUCTIONS

Fax, mail or email all printing materials to:

*Production Manager*
**FINER POINTS MAGAZINE**
P.O. Box 29460
Columbus, Ohio 43229 USA
Phone: 614-797-2265
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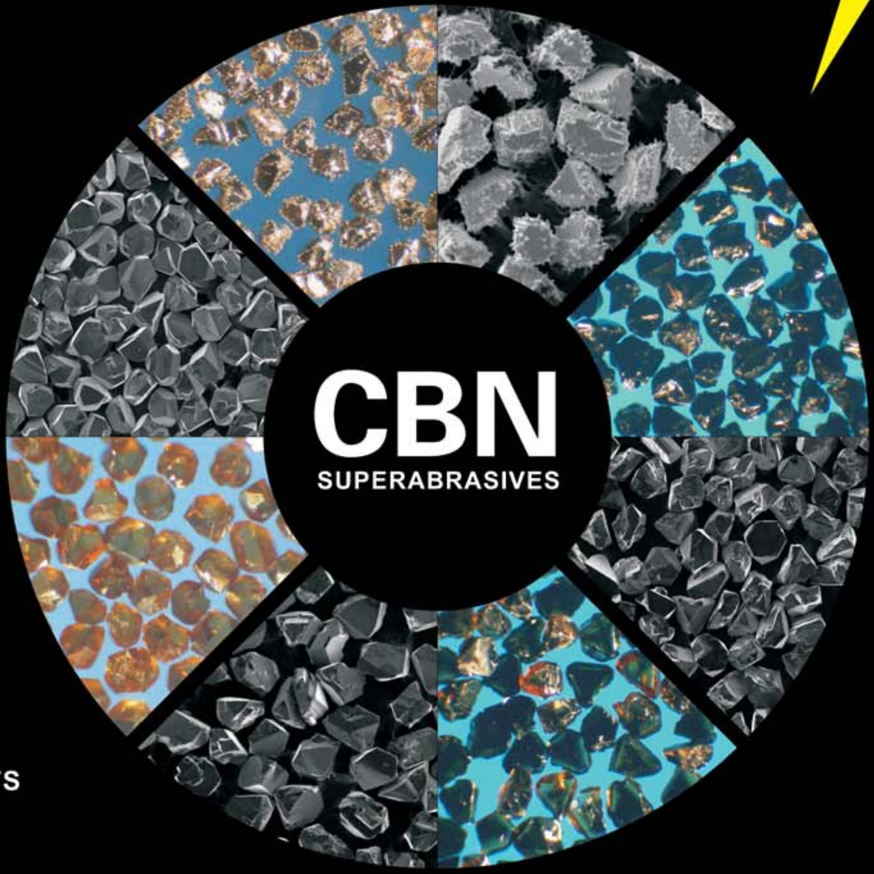

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# CHECKLIST
## *of things to do...*

INDUSTRIAL DIAMOND ASSOCIATION OF AMERICA, INC. SINCE 1946

# FINER POINTS

- ☐ Renew my subscription to Finer Points magazine.
- ☐ Reserve my ad space in the next Finer Points issue.
- ☐ Submit article for consideration in future issue of Finer Points.
- ☐ Send Finer Points my business news, new products, new hires, promotions, industry news and other press release items.
- ☐ Send in my membership application to the IDA.
- ☐ Refer a company to IDA for consideration as a member.
- ☐ Visit the IDA Website at: www.superabrasives.org and submit a question or comment.
- ☐ Contact an IDA member for products or services.

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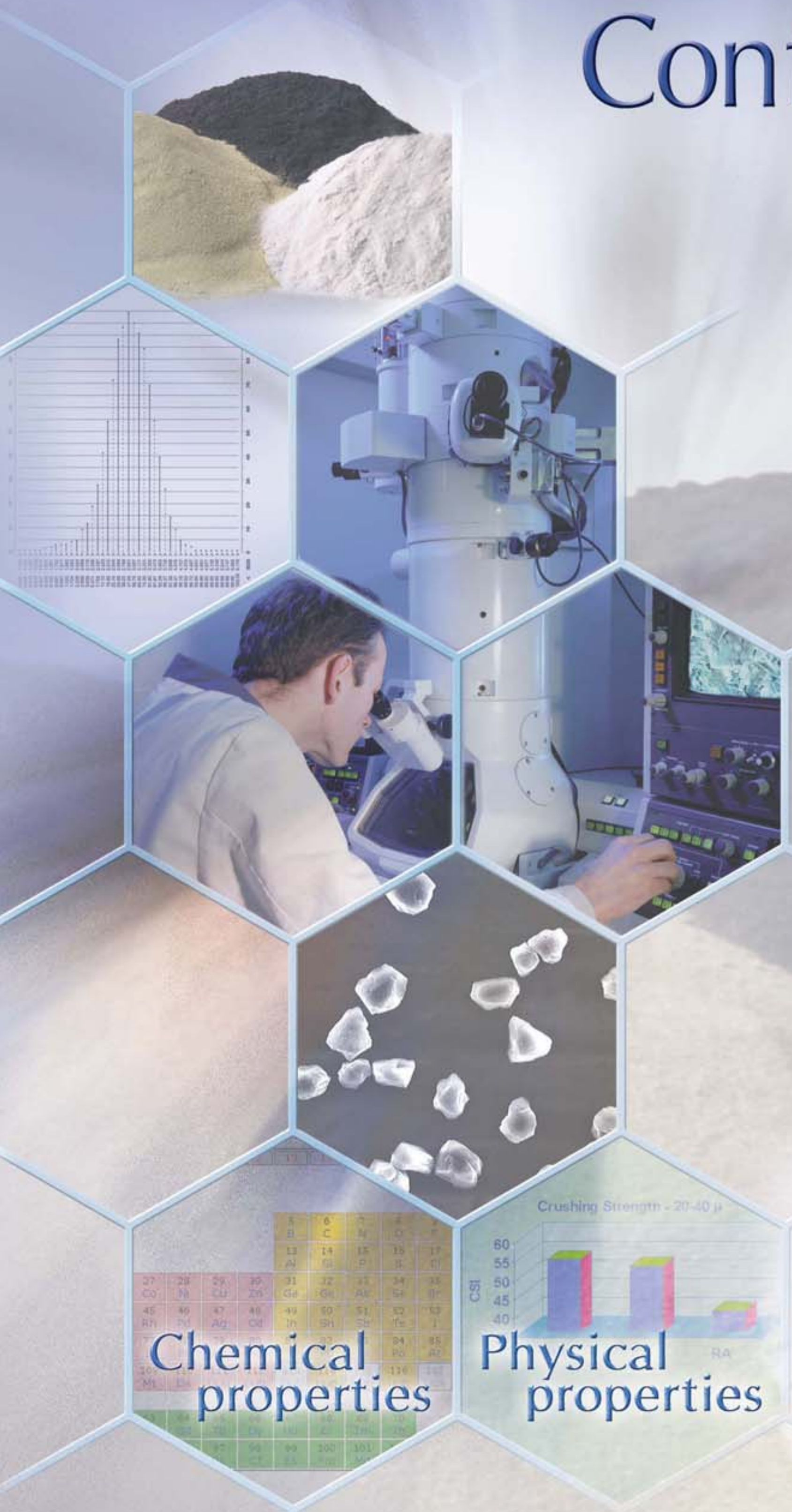

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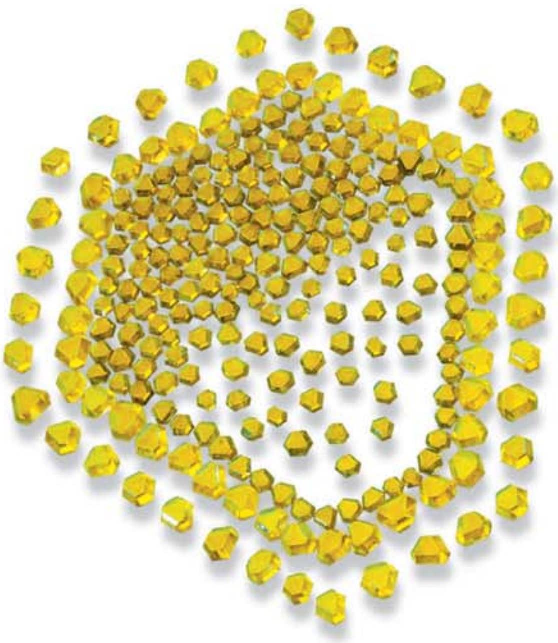

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